

This book has been written by members of the Department of Organisation and Planning of the Soviet Economy in the Economics Faculty of Moscow State University in collaboration with a number of economists from other institutions. It provides a systematic account of the main aspects of planning and looks at theoretical questions, organisational experience, and the methodology and method of national economic planning.

The general logic of the book reflects the logic and order of work

Planning a Socialist Economy

Volume 2

Edited by *L. Ya. Berry*

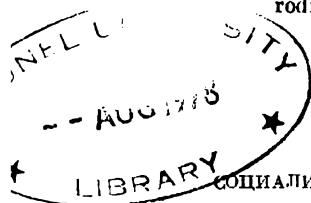


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CHAPTER I

PLANNING INDUSTRIAL PRODUCTION

1. THE PLACE OF AN INDUSTRIAL PRODUCTION PROGRAMME IN A MACRO-ECONOMIC PLAN

The plan for industrial development holds a central position in the Soviet Union's economic plan because of the leading role played by industry in the process of extended reproduction in a socialist economy and in creating the material and technical basis of communism.

Industry assumes a decisive role in speeding up scientific and technological progress, in supplying all sectors of the economy with the necessary equipment, power, and raw and other industrial materials, in increasing the efficiency of social production, in raising the Soviet people's living standards, and in strengthening the country's defence capacity.

Industry's main task is to broaden the industrial basis for socialist economic development, especially in agriculture and related sectors, to raise the technological level and efficiency of production, and to radically improve the quality of goods.

At present, priority growth rates are observable in power engineering, atomic power production above all, mechanical engineering, the chemical and petrochemical industries and in those highly effective branches of industry which have a decisive influence on the pace of scientific and technological progress and the country's growing prosperity. At the same time in every single industry production is increasing mainly due to rising efficiency and the fuller use of internal resources, i.e., on the basis of intensive factors of economic growth.

2. INDICATORS IN THE INDUSTRIAL PRODUCTION PLAN

Both physical output (for a limited range of key goods laid down by the USSR State Planning Committee) and the volume of output sold, in current prices, form part of the indicators approved by higher authorities and issued in the form of directives right down to enterprise level as part of the industrial production programme.

Planning Physical Output

Only the main types of producer goods and technical equipment, on the one hand, and consumer goods, on the other, have physical output targets fixed for them in the macro-economic plan.

In recent years the number of types of goods included in the annual state plan has been successively reduced, while the range of goods planned directly by ministries and especially ministry production associations has increased. These changes reflect the gradual extension of rights enjoyed by ministries which have now been given the responsibility for satisfying the economy's demand for the output of a particular sector.

Goods listed in the macro-economic industrial production plan include:

- a) those which are of decisive importance in ensuring the growth rates and proportions of extended reproduction laid down in the plan;
- b) those which can be used to speed up scientific and technological progress and to secure big savings as regards inputs of social labour;
- c) the most important kinds of consumer goods determining living standards;
- d) those which are important in the field of exports;
- e) those which are essential for defence and the state's special needs.

The industrial production programme also includes assignments for improving the quality of output. These quality

indicators relate to reliability in operation, durability, resistance to wear and tear, soundness of construction, basic-element content, and so on, and to grade as far as consumer goods are concerned. The various plans make provision for assignments regarding the introduction of new lines of high-quality goods in keeping with the latest scientific and technological achievements and international standards and for increasing the proportion of top-quality goods bearing the State Sign of Quality in the total volume of goods produced; they also make allowance for discarding outdated lines, and for applying new and revising old standards and technical conditions. The economic effect to be derived from producing improved and better-quality goods should be enjoyed by both producers and especially consumers.

Planning Output in Value Terms

At the present time the volume of output sold at current prices is the only monetary indicator of output that is to be fixed. Indicators of gross and marketable output have been retained simply for accounting purposes; they are used for calculating growth rates of industrial output, the sectoral and space structure of industry, volumes and growth rates of output in groups A and B, etc.

The volume of output for sale is determined by calculating the output of marketable goods and changes in unsold stocks at the end of the planning and base periods; any reduction in stocks is added on to the volume of marketable output while any increase is deducted from it (see Table 1).

3. PLANNING THE VOLUME, PRODUCT RANGE AND ASSORTMENT OF INDUSTRIAL OUTPUT

Planning the volume, product range and assortment of industrial output entails:

- determining the demand for industrial output in the economy and by the general public;

- determining the resources necessary for completely satisfying the valid requirements of the general public, current

Table 1

Calculation of the Volume of Output for Sale
(conventional figures)

	Actual	Expected	Plan
Marketable goods:			
in 1 July 1967 prices	3,140	—	—
in 1973 plan prices	—	3,470	3,600
Daily output of marketable goods:			
in 1 July 1967 prices	8.72	—	—
in 1973 plan prices	—	9.64	10.0
Unsold stocks (in days)	27	23.3	17.64
Value of unsold stocks (daily output in whole-sale prices multiplied by amount of stocks in days):			
in 1 July 1967 prices	235.4	—	—
in 1973 plan prices	—	224.6	176.4
Changes in unsold stocks	—	—10.8	50.0
Volume of output for sale	—	3,245.4	3,425.4

production needs, extended reproduction, defence, and exports;

coordinating sources and uses and deciding specific economic measures which need to be carried out during the planning period in order to enable this to be done.

The demand for industrial output in the economy and by the general public is determined by two interconnected methods:

by the use of a planning input-output table (see Chapter V, Volume 1);

by the "direct calculation" of demand for each type of product by sector in the light of the projected volume of production, operations and services in these sectors and rates of expenditure per unit of these and on replenishing stocks and on exports.

Once the size of overall demand (for coal, for example) has been established with the help of an input-output table, it should be broken down into much greater detail (by coalfield, grade of coal, etc.) chiefly by using the "direct calculation" method. The production programme drawn up for the basic planning unit—production associations and enterprises—should be the most detailed of all.

The "direct calculation" method permits determining the size of demand for output and consequently the volume of production with the high degree of accuracy necessary for ensuring balanced growth throughout the economy.

Production programmes for most of industries are drawn up territorially. These entail making calculations of the necessary production capacities of enterprises in a particular industry for every single production area, demand at each consumption point, reduced costs per unit output in the required assortment, and transportation costs between each production and consumption point.

Economic-mathematical models for the optimal development and location of individual industries and lines of production have been increasingly introduced in recent years. Production plans confront the same tasks at all levels: attainment of maximum final output (in a sector, subsector, association) of a particular kind and quality by making the best use of all available resources.

We may take as an example a transport-production problem in the optimal development and location of a particular branch of industry (for example, the cement industry). This model can be used to solve the problem of determining the necessary volume of output of a particular product, the amount of capital investment, the location of enterprises, etc.

We shall use the following denotation:

- i —index of the cement production point ($i = 1, 2, \dots, m$);
- m —number of cement production points;
- j —index of the cement consumption point ($j = 1, 2, \dots, n$);
- n —number of cement consumption points;
- r_i —index of the capacity variant at the i th production point ($r_i = 1, 2, \dots, l_i$);

l_i —number of capacity variants at the i th production point;

$a_i^{r_i}$ —quantity of cement that can be produced at the i th point using the r_i th capacity variant;

b_j —demand for cement by the j th consumption point;

$C_i^{r_i}$ —prime costs of a unit of cement produced at the i th production point using the r_i th capacity variant;

$K_i^{r_i}$ —total investment per unit of cement at the i th production point using the r_i th capacity variant;

T_{ij} —transport costs of delivering a unit of cement from the i th production point to the j th consumption point;

E —investment efficiency coefficient;

x_{ij} —unknown quantity of cement which should be delivered to the j th consumption point from the i th production point;

X_i —unknown capacity of the i th production point.

The economic-mathematical formulation of this problem takes the following form.

Find the values of x_{ij} , x_i , so that total reduced costs

$$\sum_{i=1}^m \sum_{j=1}^n X_{ij} T_{ij} + \sum_{i=1}^m X_i (C_i + EK_i),$$

where C_i and K_i —prime costs and investments corresponding to the selected capacity variant X_i , are to be minimised subject to:

$$1) \sum_{j=1}^n x_{ij} \leq x_i \quad (i = 1, 2, \dots, m);$$

$$2) \sum_{i=1}^m x_{ij} = b_j \quad (j = 1, 2, \dots, n);$$

$$3) x_{ij} \geq 0 \quad (i = 1, \dots, m; \quad j = 1, 2, \dots, n);$$

4) The value of x_i is equal to one of the values

$$0, a_i^1, \dots, a_i^2, \dots, a_i^{l_i}.$$

Other models that have so far been built are models for optimal cooperation between allied industrial enterprises

producing complex output in a particular assortment; models for the optimal use of industrial raw materials; models for the optimal use in time of material, manpower and financial resources in a sector (sectoral calendar models); and models for the optimal allocation of a sectoral production programme among the various enterprises covered by it. Two types of problem can be raised with the help of economic-mathematical methods:

to find the unknown volume of output which satisfies existing constraints and minimises the objective function of inputs for producing a given amount of output;

with a given level of inputs and given certain restrictions to achieve a maximum volume of output; in this instance maximisation of output is the criterion function.

Determining the Demand for Producer Goods

The need of the national economy for producer goods required for extended reproduction of fixed assets is determined in the light of projected volumes of capital construction financed from the state budget, funds belonging to enterprises, collective farms and cooperative organisations, bank credit, and personal savings.

The volume of capital construction depends in turn on the possibilities that exist for increasing output in the assets-creating sectors—engineering, building materials and construction industries and for a planned improvement in the use of existing enterprise capacities. Capital construction plans must be frequently coordinated and dovetailed with plans for the output of producer goods as well as with financial plans and monetary income and expenditure tables.

The overall *demand for equipment* derives from the demand for extending production in consumer sectors, for replacing and modernising worn out and obsolescent machinery and making up complex units, and for export.

Greater use of existing equipment; rational service lives of machinery, mechanical aids, and units in actual operation; the need to commission available equipment which has not yet been installed or equipment which has not pre-

viously been used in production for some reason are all factors that must be taken into account in determining the demand for new equipment. For example, the demand for agricultural machinery is calculated in accordance with the projected volume of work to be done by these machines, optimal agrotechnical completion dates, and standard output per machine according to type in every twenty-four hour period.

The quantity of machinery in stock at the beginning of a year is excluded from the overall demand fixed for each year of the planned period. Account must also be taken of the amount of machinery withdrawn from production due to wear and tear and obsolescence.

It is essential in planning the volume of output of producer goods over a five-year period to pay attention to forecasts of technological progress over the longer term, and to take account of the trends and results obtained from research into the further development of technology and its application in production. It is necessary to determine what types of new machinery, equipment, instruments, materials and products need to be designed and produced especially in order to solve complex, inter-sectoral and vital techno-scientific problems.

Aggregate norms are mainly used to determine the *demand for objects of labour* (raw and other materials, fuel) in state plans. For example, the demand for building materials is determined in the light of established norms for building-material inputs per million roubles' worth of building and installation work in different types of construction. The demand for fuel by railways is calculated in the light of the planned volume of hauls (including freight, passengers, and intra-plant) in gross ton-kilometres and the standard input of coal-equivalent per 10,000 gross ton-kilometres as well as fuel inputs for internal requirements.

Determining the Demand for Consumer Goods

Determining the demand for consumer goods assumes certain special features in long-term, five-year and annual (current) plans.

A long-term plan aims at completely satisfying people's needs for basic goods and services in conformity with scientifically validated standards. For the long-term period, production possibilities do not act as a limit.

Valid dietary standards are used as the basis for planning the production of foodstuffs in long-term plans. They are drawn up by nutrition research institutions for different age groups, regions, professions, etc., with due regard for the different social, national, climatic and other features of the various Union republics. If the demand for certain foodstuffs cannot be fully met in the next few years in accordance with these standards, then a number of measures will be undertaken in order to approximate to them to the fullest extent possible and further improve the structure of people's diet.

The volume of production for mass consumer goods is planned for a long term on the basis of scientifically validated standards of use and a rational family budget. These standards are worked out by research institutions and planning bodies.

The demand for consumer durables (refrigerators, television sets, furniture, etc.) depends, in the case of long-range calculations, on scientifically validated standards regarding the saturation level for these goods and their service life (including obsolescence). For example, if it is decided that every family should have a television set, then the demand for them will amount to 72 million sets (conventional figures) which corresponds to complete saturation. Supposing the service life is on average ten years and obsolescence occurs in eight years, then the annual demand for television sets will be equal to $72 : 8 = 9$ million sets. If production for export and for stocks is included, then about 10 million television sets should be produced a year.

In order to calculate the demand for consumer goods in five-year and annual plans the following starting data are needed:

- the volume of personal purchasing power;
- the actual structure of production of consumer goods, the structure of trade, stocks of goods in warehouses and stores, and the extent to which demand for different product groups has been satisfied;

projected changes in the structure of personal demand due to rises in the level of incomes and the trend of sales of particular goods.

The structure of demand changes as the population's requirements grow, its cultural level rises and its well-being improves. If calculations show that the planned volume of output of a certain product group exceeds the demand for it at current prices, then steps are taken to lower prices, offer a different assortment or take other measures to increase demand. Even when incomes rise or prices drop, the demand for many products remains stable or even falls while demand for other goods increases far more quickly than income. Whenever demand changes, provision is made in the plans for reducing output or withdrawing goods not in demand from production.

The scale of effective personal demand for different types of goods is decided by reference to coefficients showing the elasticity of demand, data regarding the state of the domestic market and foreign trade commitments in regard to exports and the projected import of consumer goods. Special attention should be paid to the production of goods which are currently in short supply.

Monetary income and expenditure tables are compiled which can be used to establish the amount of money the personal sector can use for consumption purposes in order to determine the overall volume of demand for consumer goods (see Chapter VI of this volume).

The books and accounts of trading organisations, the trend of sales, average per capita sales, the effect of price levels on sales, the extent to which demand has been met, changes in the level of stocks at producing enterprises and trading organisations are all analysed in the course of planning the demand for individual consumer goods. The extent to which demand has been satisfied is studied by industrial economic bodies and trading organisations on the basis of information about the sale of goods not only in the previous year but for several earlier years. Quarterly and monthly figures showing the trend of sales and stocks held in industry and the trading sector are examined, and use is made of data taken from special surveys of budgets of factory and office workers and collective farmers conducted by Central

Statistical Board agencies, and from spot surveys carried out by trading organisations. Budgetary data about the scale and structure of purchases of different goods as a function of family income level are used to decide on changes in the structure of personal demand effected by income growth.

A standard consumer's budget related to the level of income of different social groups (in per capita terms) which will be reached in the final year of the five-year planned period is drawn up in the course of compiling a five-year plan; account is taken of changes in demand for each year of the plan.

Once the change-over has been made to planning consumer goods on the basis of direct ties between enterprises and economic associations on the one hand and trading organisations on the other, it will be possible to make a fuller and more accurate estimate of personal demand and to plan the volume, product range and assortment of goods in keeping with it. If in the course of a year production plans have to be changed because of a change in demand, the associations can themselves take the necessary decisions about such changes within the general framework of the established sales plan.

The structure and assortment of consumer goods is increasingly taking shape under the influence of consumer demand. The steady rise in people's incomes and the improvement in working people's material and cultural living standards are leading to changes in the structure of demand towards more expensive foodstuffs and high-quality manufactured goods.

The need to increase state stockpiles and maintain current stocks of certain goods at a proper level, and export requirements are all taken into account in determining the demand for consumer goods.

4. THE VALIDATION OF INDUSTRIAL OUTPUT PLANS

The scale of output in keeping with established demand depends on the following factors:

- a) the initial scale of existing production capacity in

enterprises and industries with due regard to their most rational specialisation and cooperation; the withdrawal of capacity in the course of the planned period is taken into account;

b) the level of use of production capacities and the possibilities for improving their use;

c) the scale of commissioning new and modernised capacities, their running-in period and the level of their use during the planned period;

d) measures for improving the quality of output;

e) the increase in resources (raw and other materials, fuel, etc.) with due regard for changes in quality and degree of utilisation;

f) an adequate supply of manpower and its improved utilisation, a more rational organisation of labour and an increase in its productivity;

g) an adequate supply of financial resources and credit;

h) proper transport facilities.

The development of extractive industries also depends on the availability of prospected natural resources, mineral raw materials and fuels, the geological conditions affecting their exploitation at existing and newly constructed enterprises, on the width of the operating face, etc.

Questions regarding the most economic ways of effecting the production and consumption of raw materials, fuels, components and end products are of decisive importance in planning branches of heavy industry.

A reduction in the materials-intensity of output in the manufacturing branches of heavy industry, i.e., a reduction in the input of raw and other materials per unit of output will, with all the other conditions being equal, lead to a relative fall in the demand for them and consequently to a lower demand for investment and manpower.

An increase in the scale of production in an annual plan for industries producing consumer goods made from agricultural raw materials is mainly determined by the possibilities that exist for increasing the production and supply of the appropriate types of agricultural raw material. In order to satisfy the public's demand for food and manufactured goods, it is a matter of prime importance to increase the

output of agricultural products and their procurement from collective and state farms.

In many branches of light industry production capacity may in some years act as a factor limiting growth of output. In such a case provision is made in capital works plans for increasing capacity at existing enterprises and building new ones in order to ensure a correspondence between the raw materials base and the production potential of enterprises within the shortest time possible.

In planning the range of output, attention must first of all be paid to those types of consumer goods affected by fast changes in demand due to changes in fashion, a demand for better quality and a rise in incomes. Besides discontinuation of the production of out-of-date goods no longer in demand, the plans foreshadow the introduction of promising new lines of output for which demand is tending to increase. Industry should take on the responsibility of not only studying demand but actively influencing it.

The production of many kinds of consumer goods (clothes and knitwear, shoes, fabrics, etc.) is planned on the basis of direct contact between trading organisations and industrial economic bodies and enterprises. The production plan as regards product range and assortment is formulated on the basis of orders from trading organisations, and conditions of supply and delivery dates and other contractual agreements are drawn up on the same basis. In turn, enterprises which have concluded direct agreements with trading organisations establish direct contact (independently or through supply organisations) with suppliers of raw and other materials, and semi-finished goods. For example, shoe factories conclude agreements with tanneries and enterprises supplying accessories for their products in the assortment necessary for fulfilling the orders made by the trading organisations. If it becomes apparent that urgent changes need to be made in the production plan due to changes in demand, then the various industrial units (associations, firms) and enterprises are obliged to make the appropriate adjustments in their plans in agreement with the trading organisations,

The Volume of Production and Production Capacities

In determining the size of production capacity, the fullest possible use of basic technological equipment and production areas, together with improvements in the advanced technology of production and the organisation of labour and provision for high-quality output, forms the basis for calculations.

The production capacity of an industry for a particular type of output (for example, ferrous metal products, cotton textiles, etc.) is determined by the aggregate capacity of enterprises and individual specialist shops and works belonging to that industry. Cooperation between different works within an industry and inter-industry cooperation enables much fuller use to be made of the production capacities of each particular enterprise belonging to that industry. Thus, poor use may be made of capacity installed at major engineering factories because of a lag in capacity in their foundry or forge shops. In such an event delivery of castings or forgings from outside permits a sharp increase in enterprise capacity. Thus, in determining the production capacity of an entire industry, account is taken of an increase in the aggregate capacity of individual enterprises as a result of cooperation in production.

Production capacity at the start of a year is called input capacity and that at the end of a year—output capacity. The production plan is fixed on the basis of the average annual capacity of an enterprise which is determined by summing the available production capacity at the beginning of the year and the average annual capacity commissioned in the course of the year, excluding the average annual amount of capacity withdrawn from production. It is difficult in drawing up a five-year plan to establish the scale of commissioning capacity for each quarter of each year in the plan. In this case the average annual commissioning (withdrawal) of capacity is taken as equal to 35 per cent of the projected commissioning (withdrawal) of capacity throughout the year.

The basic factors determining the production capacity of an enterprise are: a) the number of machines, mechanical

aids and units of a particular type installed at an enterprise; b) the production area of enterprises and shops; c) an enterprise's work routine, i.e., the number of shifts, working days or hours in each month, quarter, and year, excluding time spent on capital repairs; and d) the techno-economic standards governing the operation of machinery, mechanical aids, units, and apparatus. Equipment belonging to ancillary shops and equipment held by technical service departments and shops are not included in the calculation of capacity.

As the new technology is mastered and the experience of leading production workers accumulated, the standards underpinning the projected production capacities become out-of-date and have therefore to be re-examined with a view to raising them.

Planning the volume of production and capital construction should start by calculating the maximum possible output of goods using existing capacity and basic assets so that the need to create new capacities in order to secure the planned volume of output should be minimal. In order to do this it is imperative to decide what changes will occur in existing capacities during the planned period and calculate for each year the maximum possible coefficient for using these capacities.

The size of existing production capacities can be increased by carrying out organisational and technical measures in the course of the year, modernising and reconstructing existing equipment and units, etc.

The yearly output of goods using existing capacities can be established by multiplying the average annual capacity existing in a particular year by the coefficient of use planned for that year.

Estimating the Necessary Commissioning of New Capacity

In order to ensure the production of that part of output that cannot be obtained from existing production capacities, the necessary commissioning of new (additional) capacities should be determined.

The planned volume of production, possible output from existing capacities, and the extent (in percentage terms) to

which newly commissioned capacities have been brought on stream in each year provide the initial data needed for deciding the necessary commissioning of new production capacities in the planned period.

The method of calculating the commissioning of new production capacities in a five-year plan is as follows:

a) an estimate is made for each year of the plan for that part of output which cannot be obtained from existing production capacities and for which new (additional) capacities must be commissioned. This part is calculated as the difference between the total planned volume of output and output obtainable from existing capacities;

b) an estimate is made for each year of the average annual amount of newly commissioned capacities necessary for producing a given volume of output, in accordance with the following formula:

$$\bar{V}_m = \frac{X_1 - X_0}{U_n} \cdot 100,$$

where

$\bar{V}_m$ —necessary average annual amount of newly commissioned capacities in each year of the planned period;

X_1 —volume of output in each year which cannot be obtained from existing (at the beginning of the first year of the five-year plan) capacities and for which new capacities have to be commissioned;

X_0 —volume of output obtainable in a particular year from capacities commissioned in preceding years of the five-year plan (defined as the sum of the products of capacities commissioned in each previous year and the extent to which they have been brought on stream in that particular year);

U_r —coefficient showing the extent to which newly commissioned capacities have been brought on stream by the end of the year which is taken into account for each type of output in keeping with accepted norms regarding induction periods;

c) the full volume of commissioned capacities is established on the assumption that the average annual amount of newly commissioned capacity, as indicated above, is taken

to be 35 per cent of the projected commissioning of capacity in the course of the year;

d) the coefficient of use of newly commissioned capacities is laid down for each year as the percentage of output to the average annual amount of capacity commissioned. The coefficients of projected capacities brought on stream (U_o) at the end of the year are differentiated according to industry and line of production. The vital task facing every enterprise is to see that commissioned capacity is brought on stream in as short a time as possible subject to observance of the established standards regarding quality of output.

If the size of capacity to be commissioned is already known, then the initial information for calculating the volume of output to be obtained from newly commissioned capacities during the planned period is as follows: the scale of capacity commissioned in each year of the planned period; the extent to which newly commissioned capacity is brought on stream in each year, expressed as a percentage of projected capacity; and the coefficient of use of commissioned capacities.

Planning bodies are charged with examining the calculations made by ministries, departments, and regional economic management bodies, making any necessary corrections with due regard for centralised investment funds and undertaking the summary calculation of the commissioning of capacity and the output of goods from capacities commissioned during the planned period at both existing and new enterprises.

Ensuring a Supply of Materials for the Production Programme

The production plan must be adequately supplied with raw and other materials, fuel, power, semi-finished goods and parts supplied as a result of cooperation.

Estimates of industrial demand for materials are made at the same time as estimates concerning the possibilities of an optimal increase in their deliveries from domestic production, the mobilisation of stocks and, if necessary, from imports.

In the course of plan compilation needs and sources are successively coordinated by compiling input-output tables for individual products, product groups and types of output.

Aggregate methods are mainly used in assessing the demand for raw and other materials, fuel and power in central and republican planning bodies, while more detailed methods are used in economic associations and at enterprises.

In the early stages of work (when determining the principal lines of development for the five-year plan or control figures for the annual plan) aggregate estimates are made with the help of physical input-output tables showing the production and consumption of different types of output. Actual physical input-output tables are drawn up at later stages.

Output in sectors producing circulating assets which are included in the input-output calculations should correspond fully to the demand for these resources not only in respect of total amount but also with regard to type, grade, etc. Should disproportions appear between validated demands and sources for meeting them, measures should be taken to increase production and the volume of deliveries as a result of cooperation. Once production plans and demand have been carefully coordinated, plans for the supply of materials and technical equipment are drawn up.

5. PLANNING THE SPECIALISATION, COOPERATION AND COMBINATION OF PRODUCTION

Planning Specialisation

It has been pointed out above that specialisation and cooperation between enterprises and inter-sectoral cooperation increase overall production capacity for a particular type of output. This is achieved by concentrating the production of similar output at enterprises specialising in this kind of output; by singling out the manufacture of particular parts, components and units as separate lines of production; and by singling out different stages in the technological process as independent enterprises or shops.

An estimate of the amount of output obtained by extending specialisation can be made taking the following factors into account:

1) the maximum possible increase in output at specialised enterprises and their release from producing goods which are not in keeping with their production profile;

2) stopping the duplication of production of one and the same type of output at various non-specialised enterprises;

3) organisation at the present-day technological level of the centralised production of semi-finished goods, parts, components and items that can be used on a mass scale, both inter-sectorally and within the sector.

Provision is made in the plans for the specialised production of general engineering and inter-sectoral goods to grow much faster than the total volume of engineering goods.

Consideration is given when compiling long-term plans to suggestions regarding the development of specialisation made by the bodies of the Council for Mutual Economic Assistance not only in the Soviet Union but also in the other socialist countries which belong to it. The rational division of labour between these countries acts as the guideline here.

An increase in the level of production specialisation is shown in the macro-economic plan by the following indicators: the proportion of specialised production in the total output of a certain type of product in the country; the number of specialised enterprises and shops and their proportion in the total number of enterprises producing a given type of product; the proportion of specialised output in the total volume of output in a particular sector.

Planning Cooperation

Growing specialisation is inseparably linked with cooperation in production. Cooperation between different enterprises in producing a certain output makes it possible to make better use of the production capacities of each enterprise, to eliminate irrational and establish the most economic production ties between enterprises and sectors jointly manufacturing certain types of output. The need arises

in this connection of developing direct and long-lasting ties on a broad and comprehensive scale. This is an important condition for greater plan stability, rhythmical operation of enterprises, an extension of their independence in the field of planning and a strengthening of the economic initiative of production work forces.

The plan for cooperative deliveries of output produced and used within a sector is compiled by a ministry (department).

The planning of cooperative deliveries at the inter-sectoral level is undertaken by central planning bodies which draw up physical input-output tables and use them to compile cooperation plans for actual types of output. The plan indicates the product range, scale and dates for deliveries of parts, components, and semi-finished goods to actual customer enterprises by way of cooperation and the corresponding orders to supplier enterprises. Goods supplied under cooperation schemes should reach the customer on the exact delivery date agreed, in the assortment laid down in the plan and in a form ready for subsequent processing. Any deviation from these rules, disregard for delivery dates, or wilful divergence from the required assortment or from technological conditions can cause serious economic difficulties.

Inter-regional plans for cooperation are drawn up by planning bodies in the Union republics. Plans for administrative areas provide that supplier enterprises are linked up with customers so as to ensure the minimisation of expenditure on subsequent processing and transportation.

Planning Combination

In planning the volume, product range and assortment of industrial output, full account is taken of the effect that combination in production has on increasing output and raising economic efficiency. Combination is mainly achieved by combining different production processes within a single enterprise (or production association) so as to secure successive processing and the complex use of raw materials and by-products, and by creating economically efficient agro-industrial complexes.

Combination in production improves the use of production capacity, ensures the continuity of technological processes, shortens the production cycle, helps to make all-round and economic use of raw materials and equipment, widens the assortment of goods and makes full use of manpower resources. In this way labour productivity increases and production is cheapened. If related enterprises are combined, there is an increase in the return on assets, transport savings are made, the relative amount of necessary production stocks is lowered, and the number of administrative staff is reduced.

Such indicators as the volume of output in physical and value terms obtained from combined enterprises and its share in total output of the goods in question, the quantity and value of products that can be obtained from one ton or one cubic metre of processed material, etc., can be used in planning the development of combination in production for different industries with due regard for their specific features.

Plans for combination drawn up by ministries include measures to increase output, create new capacities and improve the utilisation of manpower through combination. New lines of production must draw their work force from a redistribution of personnel within the combine. Such plans are backed up by calculations regarding the total economic effectiveness of combination measures.

6. PLANNING ANNUAL AND QUARTERLY OUTPUT

In the five-year macro-economic plan industrial output targets are fixed for each year. This annual distribution forms the basis for current economic planning. The annual plan is a component part of the five-year plan. However, in the course of implementing the five-year plan changes arising from newly discovered needs in the economy and new opportunities and resources for increasing output can be made in the annual assignments of the five-year plan.

In distributing output on an annual basis account is taken of various requirements in the economy in each single year as fixed by the tasks and goals of the long-term plan; for

example, account is taken of the growth of production capacities due to be commissioned in the course of the year, the improved use of existing capacities, the growth of mineral raw material resources, and the growth of labour productivity. Requirements and resources should be dovetailed not only in the final, the fifth year of the five-year plan period, but also within each year.

When a five-year plan is compiled in annual segments, attempts are directed first of all at ensuring high and stable growth rates throughout the planned period and an absolute increase in the scale of output from year to year in keeping with the growth in demand. This is one of the main tasks in planning an economy. The growth rates of industrial output in different sectors should be strictly coordinated and dovetailed for each year of the perspective period. Annual output plans should be made to agree with annual physical input-output tables and production capacity tables.

The annual output plan drawn up by ministries on the basis of assignments in the five-year plan is broken down into quarters and handed down in that form to enterprises, with a limited number of key indicators. The annual output plan for different industries shows the growth in production and sales quarter by quarter.* This growth should, however, be strictly coordinated with demand, i.e., with the plans of allied enterprises and sectors, trade and export plans, etc.

A quarter-on-quarter increase in production in the course of a year can be ensured by:

- carrying through technical, economic and organisational measures for a fuller and more rational use of all available resources at enterprises and in sectors;

- commissioning new production capacities and bringing them on stream;

- increasing raw material resources.

In industries which depend on seasonal input of agricultural raw materials, measures should be taken to ensure fuller use of capacities both at the height of the season and at times when their capacity can be used to produce other goods.

* Excluding certain industries in which production is of a seasonal nature.

CHAPTER II

PLANNING AGRICULTURE

1. COORDINATION OF CENTRALISED AND LOCAL PLANNING

The plan for the development of agriculture is an organic and integral part of the macro-economic plan. Only in the course of planning macro-economic proportions is it possible to determine demand for agricultural products in the planned period rationally and well in advance, and to provide for the creation of the necessary production capacities in industry, construction, transport and communications that permit the continuous intensification of agricultural production and its gradual transition to an industrial basis.

A macro-economic approach is also essential when planning consumption and accumulation in agriculture and balancing income and expenditure in this sector of the economy.

At the same time, a number of crucial planning problems can be solved within the framework of agriculture itself. Thus, plans must incorporate measures aimed at the fullest and most economic use of available material and manpower resources. They must ensure the rational location, specialisation and concentration of agricultural production and an improved intra-sectoral proportions.

Rational planning of agriculture calls for coordination between centralised planning and on-the-spot planning of production by each agricultural enterprise, making extensive use of economic levers.

When planning the development of agricultural production on a national scale, first of all the macro-economic demand for agricultural products is determined, with national needs (i.e., state purchases) shown as a separate item; and then the demand of agriculture for materials and technical

equipment for the production of agricultural products on a scale large enough to satisfy the needs of society is decided. It is an important function of centralised planning to establish economically valid prices for state purchases of agricultural products and the sale of producer goods to collective and state farms.

In order to arrive at a correct solution to these crucial problems of macro-economic planning, careful study must be made of the public demand for foodstuffs and other consumer goods that use agricultural raw materials in their production, taking into consideration population growth and higher income levels. At the same time, the demand for agricultural products to create stocks for export and for meeting other state requirements must also be taken into account. In addition, the demand of agriculture itself for producer goods, finance and agricultural products for purposes of reproduction must be carefully substantiated. On the basis of these calculations, fundamental measures for the intensification, specialisation and concentration of agricultural production are determined, as well as its scale and structure and the necessary investments, building materials and technical equipment.

The state macro-economic plan lays down the following basic indicators of agricultural development:

- state procurements (purchases) of the main types of agricultural products and raw materials;

- deliveries of these products to the state for stockpiling;

- state investments in agriculture;

- commissioning of fixed assets and productive capacities;

- deliveries to agriculture of industrial goods, such as tractors, motor vehicles, mineral fertilisers, building materials, mixed feeds and vitamin supplement meal for livestock farming;

- irrigation and land improvement schemes;

- a percentage decrease in the prime costs of agricultural output on state farms that are not fully run on a profit-and-loss basis.

In the early stages of formulating the macro-economic plan, central, republican (regional, territorial) planning bodies carry out the requisite aggregate planning calculations of farm land, areas under crops, numbers and structure

of breeds of animals and poultry, fixed and circulating assets, overall scale of mechanised and manual agricultural labour, scale and structure of gross and net output, wage levels of agricultural workers and income and expenditure of collective farms. All these indicators are in the nature of guidelines and are not taken down to collective and state farm level. Calculations carried out by the central planning bodies make it possible to determine the main parameters and trends in the development of the agricultural sector.

This stage of the planning work provides the most important indicators (control figures), which form the basis for subsequent work on drawing up the detailed plan for the development of agriculture by the collective and state farms themselves. Local geographic and economic conditions are taken into account, and cooperation and control are provided by local planning and agricultural bodies. Among these control figures, the plan for the purchase of agricultural products from collective and state farms plays a particularly important part. Planning the purchase of agricultural products makes it possible to concentrate in the hands of the state the resources necessary for supplying the public with foodstuffs and processing industries with raw materials, and for creating the necessary stocks for export and replenishing state stockpiles, etc.

An economically substantiated plan for the purchase of agricultural products calls for a close combination of the interests of society as a whole, represented by the state, with the interests of individual farms, their production work forces and every agricultural worker.

The state, through its planning bodies, lays down firm planned targets covering a number of years for each collective and state farm, specifying all the products that farms must sell to the state at fixed planned purchase prices. These planned targets are obligatory and are not subject to change. In view of the fact that planned purchases of agricultural products, particularly grain, do not meet all the needs of the state, provision is made for purchases over and above the planned amount. As an economic incentive to selling output (particularly grain, cotton and animal products) to the state over and above that laid down in the plan, premium prices for these products are fixed. These are

50 per cent higher than the basic purchase price paid to farms for the sale of output under the order-plan.

When the total amount of purchases and their distribution among the regions are being determined, it is essential to ensure that state needs as regards agricultural output are fully met. At the same time, collective and state farms must have sufficient resources for extended reproduction and enabling them always to follow the principle of increasing workers' material motivation.

Purchases of agricultural products are calculated on the basis of the public demand for foodstuffs, and industry's demand for raw materials. These demands are determined by taking into account existing levels of production and consumption and the increase in production and demand for output in the planned period. In this connection, agricultural products can be divided into two groups. Products in the first group—raw cotton, tobacco, wool, hides, etc.—are all, or nearly all, sold to the state. Calculations relating to their production and sales to the state usually coincide. A significant proportion of products in the second group—grain, potatoes, oil-bearing crops, meat, milk, eggs, etc.—are used as producer goods in the course of agricultural production—as seed or animal feed, and as consumer goods.

In order to determine the amount of output to be sold to the state, input-output tables must be drawn up for the total number of farms, showing production and output allocation (Table 2).

Input-output tables for arable products are drawn up from 1st July of the current year to 1st July of the following year, while those for meat, milk and eggs cover a calendar year. The tables are drawn up for a number of years. Comparison of each item in the plan calculation with past figures gives a clearer picture of where planning projections have been correct, and reveals the trend of changes that have taken place under the influence of demand, specialisation and other factors.

Input-output tables regarding the production and allocation of agricultural products must be carried out for every republic, region (territory), district, collective and state farm. With these calculations, full consideration can be

Table 2

Model Input-Output Table of Gross Resources
(million tons)

	Period under review		Planned period		
	1969	1970	1971	1972	1973
1. Sources					
Gross output of farms					
Purchases from state organisations* . .					
Total					
2. Uses					
Sales to state					
Consumption in agricultural production (seed, animal feed, etc.)					
Transfers and sales to collective farm workers and their families as wages, sickness benefits, etc.)					
Sales on the collective farm market . . .					
Sales to cooperatives and other organisations					
Other outgoings . . .					
Wastage (losses) . . .					
Total					

* This refers to the purchase of high-grade seed, fodder grain, etc., from the state by collective and state farms.

given to the possibilities of extending reproduction at all these levels.

When planning tasks relating to the sale of output to the state are laid down for each collective and state farm, district production management boards collate the indicators from the farm input-output tables in summary input-output tables, analyse them taking into account the planned specialisation and possibilities of each farm, and determine the order-plan for the collective and state farms. The order-plan relating to grain is firmly (unalterably) fixed by the government for all the years of the five-year plan.

On the basis of the volume of purchases of agricultural products handed down to them, collective and state farms, with the help of production management boards, draw up a detailed production plan for the development of their farm.

2. PLANNING THE VOLUME OF OUTPUT OF AGRICULTURAL PRODUCTS ON COLLECTIVE AND STATE FARMS

A socialist state, through its central and local planning bodies, carries out the necessary planning calculations for all the principal indicators of growth and development of all agricultural production well in advance. These calculations cover, not only planned procurements of agricultural products, but also their production, areas sown to all the different crops, numbers of the different kinds of livestock, crop yields, livestock productivity, and volume of, and time taken over, the main types of agricultural work, etc.

Such calculations are necessary, firstly, to find out whether the planned volume of production ensures the fulfilment of plans relating to the purchases of goods by the state to meet national needs; secondly, to determine to what extent the planned volume of production meets the needs of agriculture itself; thirdly, to ensure that the planned volume of production is supplied with the necessary material and technological means produced in other sectors of the economy, particularly in industry; and, lastly, to maintain a correct balance between goods for sale and money incomes.

All these calculations, however, and the planned indicators showing the development of production that they contain, are not passed on as an obligatory plan target but simply serve as an economic basis for the most important control figures in the macro-economic plan, which form the criterion for assessing the summary plans for the development of agricultural production, drawn up by collective and state farms themselves.

The drawing-up of detailed plans for the development of agricultural production by collective and state farms themselves does not begin until they have received the plan targets relating to the sale of output to the state. They form the basis for determining the planned volume of production of arable and livestock farming.

The most important task involved in planning agricultural production on each collective and state farm is to find those ways of intensifying production that would, with minimum inputs, increase the production of gross and marketable output, fulfil directives relating to state purchases of agricultural output, ensure that the farm's own needs for seed, animal feed and foodstuffs for their workers' own consumption are met, set aside a part of output for distribution as payment for work done (on collective farms) and for sale on the collective farm market, etc.

Planned volumes of production must be coordinated with the possibilities of supplying materials and technology, and with manpower and financial resources.

Arable Output

An on-the-spot production programme for arable farming is drawn up only after a detailed economic analysis has been made of the state of the arable sector and all agricultural production over the past 3-5 years. An analysis is made of output growth rates for all the main products, levels of yield, and economic efficiency, as well as information supplied by research establishments and the experience of successful farms.

Planning crop yields is one of the main aspects of the work entailed in the plan. Indicators of planned yield are worked out on each collective and state farm, taking as a

basis the average actual yield over a 3-5 year base period on the farm concerned, and information on rates of yield on state-run model plots, experimental farms and the most successful farms in the area. A whole series of agro-technical measures and the level of provision with materials and technical aids are taken into consideration. By comparing the agricultural technology on the farm (or in the district) with that of the most successful farms, the measures that must be introduced to achieve planned yields in each crop can be decided on.

Whenever a new agricultural technique is introduced, calculations are made to assess its efficiency. The effectiveness of applying fertilisers, for example, is assessed as the difference between the value of additional output (at purchase prices) achieved as a result of using fertilisers and the costs of the fertiliser, and of transporting it, applying it to the soil and harvesting the additional yield.

Before calculations are carried out to decide on the areas to be sown to particular crops and the most efficient structure for areas under crops, an economic evaluation is made of the different crops. Such an evaluation is of particular importance in the case of substitute crops and in the case of output in livestock-feed production. Efficiency in the production of particular crops is determined for a base period (3-5 years) and for a future period on the basis of the following set of indicators:

1. Crop yield in natural weight and, in the case of fodder crops, both also in feed units and as digestible protein (100 kg per hectare).

2. Cost of production of 100 kg of output in natural weight measured in feed units (roubles).

3. Value of gross output per rouble of production costs and per man-day (roubles).

4. Value of gross output at purchase prices and net income per hectare (roubles).

5. Labour input on the production of 100 kg of output in natural weight and in feed units (in man-days).

Comparison of the above indicators in respect of different crops makes it possible to decide which provides the greatest benefit given the environmental and economic conditions of the farm concerned.

The selection of crops and the areas to be sown to them is decided, and the most favourable structure for sown areas is achieved on the basis of the scientific system of arable farming that has been recommended for collective farms in a given area, and taking into account the estimated efficiency of production of particular crops and the conditions on a specific farm.

A preliminary plan for the production of grain, broken down into particular grain crops, is drawn up on the basis of assignments relating to the sale of different types of grain to the state. In addition, the demand for grain to be used for production purposes (seed, animal feed) and for public catering is calculated. The collective farms also plan to produce grain in sufficient quantities to create additional, statutory, stocks.

Once these stocks have been built up, measures are worked out to increase the production of grain and other products for sale to the state over and above the plan.

Knowing the planned volume of production of particular arable crops and the accepted yield of the crops makes it possible (by dividing gross harvest by yield per hectare) to determine what areas need to be sown to each crop. The planting of one or another crop on the farms is planned according to the crop rotation that is adopted.

By collating the plans of collective and state farms, the planning bodies produce summary figures on the size of areas and volume of output, aggregated by district, region, republic and the country. These figures are used when the state macro-economic plan is being drawn up but they are not approved as part of the plan.

Livestock Output

Planning livestock output requires a great deal of preliminary work, including an analysis of the development of livestock farming over the preceding 2 or 3 years and the drafting of measures relating to specialisation by farms and livestock units, the provision of sufficient amount of animal feed, and farm buildings for livestock, improvement of the pedigree of herds, etc.

Three crucial factors must form the basis for a production plan for livestock output: fulfilment of the plan relating to the sale of livestock products to the state; creation of the necessary stocks of these products for consumption on the farms; and ensuring reproduction as the basis for the further development of livestock farming.

The most complicated aspect of drawing up a production plan for livestock is to formulate the basis for a meat production plan. The volume of production for all kinds of meat is planned in terms of carcass weight, which is the

Table 3

Turnover of a Herd of Cattle on a Dairy Farm
(conventional figures)

Animals by sex and age	No. of head at beginning of year	Additions			Reductions							No. of head at end of year
		Herd increase	Purchases	Transfer from younger groups	Transfer to older groups	Culling for meat	Sales		Total to be sold			
							for meat	for breeding	No. of head	Average live weight per head, kg	Total weight of No. of head to be sold, kg	
Stud bulls	2	—	—	1	—	1	—	—	1	600	600	2
Cows	48	—	—	7	—	5	—	—	5	500	2,500	50
Heifers	8	—	—	8	7	1	—	—	1	400	400	8
Young stock over 1 year old	20	—	—	25	9	—	11	—	11	320	3,520	25
Calves up to 1 year old	22	—	—	50	25	—	20	2	20	240	4,800	25
Herd increase in current year	—	50	—	—	50	—	—	—	—	—	—	—
Total	100	50	—	91	91	7	31	2	38	—	11,820	110

net weight of the dressed carcass of a slaughtered animal. The anticipated carcass weight is calculated from the number of livestock reared for slaughter—cattle, pigs, sheep and poultry. Slaughter animals include livestock to be sold to the state, as well as those sold on the collective farm market and slaughtered on the farms for their own needs.

The volume of production of meat and the rearing of productive livestock and poultry is arrived at by drawing up a table (herd turnover) for the various types of livestock (Table 3). Such a table makes it possible to determine the productive potential in the rearing of productive livestock and poultry (live weight) and the production of meat and hides and the average annual number of livestock.

Output in livestock and poultry rearing (live weight) includes the total weight of productive livestock and poultry, i.e., the difference between the weight of the productive livestock and poultry at the beginning and at the end of the year, less the live weight of purchased livestock. To convert the live weight of livestock and poultry into meat, i.e., carcass weight, coefficients (according to types of livestock) are used that are arrived at on the basis of figures supplied by meat combines and confirmed by statistical agencies. These coefficients are used for the planned period, taking into account anticipated changes in the breed and age and fatness of the livestock to be sold.

Plans for the development of livestock farming, drawn up by collective and state farms, are collated according to regions, districts and republics, and are summarised, analysed and taken into account when related indicators for the macro-economic plan (volume of gross output, increased labour productivity, etc.) are determined.

Animal Feed Base

The formulation of plans for livestock farming must begin with a study of the present condition and future development of the animal feed base and the economic effectiveness of using particular feeds. In accordance with the planned yield of fodder crops, the feed must be found that provides the greatest benefit in the local conditions, both in terms

of yield of nutrients per hectare and cost of a unit of feed.

If the plan is to have a sound basis, it is above all essential to determine what feedstuff resources are available and coordinate them with plans for the development of livestock farming. This is done by drawing up an input-output table for feedstuffs.

Before the feedstuff table is drawn up, the demand for feed in livestock farming should be established: in natural weight, as feed units and as digestible protein. Demand for feed (in feed units) is estimated according to standard inputs of feed for producing one unit of output in the case of productive livestock and poultry, and per head in the case of draught animals.

Standard inputs of feed are arrived at on collective and state farms on the basis of scientific recommendations, the experience of successful farms, and taking local conditions into consideration. The higher the level of productivity of livestock and poultry, the lower are inputs of feed per unit of output, the relative inputs of labour and the cost of production. The possibilities of increasing the productivity of livestock farming must, therefore, be carefully studied.

Estimated demand for feeds by type in feed units and as digestible protein is then translated into physical indicators according to the coefficients of nutritional value for the corresponding types of feed. Separate provision is made for feed to be sold to the state, put in contingency stocks and for losses during storage. The size of contingency stocks is determined variously according to different areas and farms, but it should not be less than a month's stock. Losses of feed during storage are determined according to methods of storage and local conditions.

When demand for feed is being determined, supply sources are noted and a coordinated input-output table is drawn up in physical terms, feed units and as regards protein. The input side of the table should equal demand, which is met by the farm's own production and by purchases.

Input-output feedstuff calculations are done for one calendar year. Livestock output in the planned (calendar) year is supplied with feed from the harvests of two years—the planned year and the preceding year. The quantity of feed that can be consumed out of the harvest of each of these

two years is fixed according to local conditions. On average, over the past few years, collective and state farms throughout the country have been consuming during the harvest year (i.e., to the beginning of the following year) 30-35 per cent of hay, straw and silage and 35-40 per cent of potatoes, other root crops and fodder grain.

The efficiency of planned measures is assessed approximately on the basis of the following indicators: actual output in physical terms per head of livestock at the beginning of the year, and per ton of feed units for the different sectors of livestock farming (kg), and in value terms (at comparable prices) for the whole of livestock farming (roubles); and actual livestock output in value terms per rouble of production input (roubles). These indicators may be compared with analogous indicators relating to the previous period. Such comparisons make it possible to work out rational measures for the intensification of livestock farming.

3. PLANNING THE MATERIAL AND TECHNOLOGICAL BASIS OF AGRICULTURE

The complex mechanisation of farm production, use of the most advanced machinery and mechanical equipment, the widespread electrification of production processes, and automation comprise the main task in planning the technological basis of agriculture.

Mechanisation of agricultural production entails the introduction of mechanised systems on every collective and state farm, taking into account the special features of the area and the specialisation of farms. A planned mechanised system must be created taking into account recent scientific and technological advances in the field of agricultural machinery. It must ensure that all work, both basic and ancillary, be accomplished by mechanical means, that advanced technology is used, and that inputs of labour per unit of output are substantially reduced. The machinery making up the technological stock must be coordinated as to size, type and productivity in successive processes and operations.

A mechanised system must consist of a minimum number of types and models of tractors and other agricultural machinery and equipment so as to obtain their maximum use during the year. A rational selection of machinery should ease the strain of work at peak periods, reducing demand for both technology and manpower at such times to a minimum.

When planning the material and technological basis of agriculture, it is of the utmost importance that demand for tractors, vehicles, combines and other agricultural machinery is correctly determined. Demand for production equipment is assessed on the basis of the planned volume of work in accordance with the standard technological sheets that will be used in the period ahead.

Standards relating to the use of the agricultural machines (productivity by the hour and day, time taken to accomplish farm work according to agricultural and technological conditions, etc.) are entered on these sheets. They should be revised by taking into account conditions on a particular farm and the achievements of successful farms. The anticipated withdrawal of machinery from service is assessed on the basis of standard practice, the service life of machinery and actual figures over past years. In this connection, the technological condition of the machinery must be borne in mind and whether it would be best, from the economic point of view, to replace it with new machinery.

In view of the fact that tractors and many other types of agricultural machinery are used in the cultivation and harvesting of several different crops, their estimated work load is determined on the basis of the period of maximum strain, for which purpose additional calculations are carried out. The maximum work load for ploughing tractors, for example, usually falls in the autumn ploughing season, when ploughing and sowing for winter crops, early spring work, etc. When determining demand for ploughing tractors, the fact that a proportion of tractor-cultivators is used for ploughing is taken into consideration.

The number of ploughing tractors and tractor-cultivators, that has been established by taking periods of maximum work load, must be checked and specified in the light of

other important work periods. If the number of ploughing tractors is determined according to autumn ploughing, it is necessary to check the extent to which ploughing tractors, in conjunction with tractor-cultivators, can ensure that spring work is accomplished. Ways of ensuring the accomplishment of the whole range of work involved in the harvest season must also be checked.

Demand for other types of agricultural machinery is planned along similar lines.

Particular attention must be paid to planning the mechanisation of labour-intensive processes in livestock farming.

The complex mechanisation of livestock farming units means essentially that they must be equipped with a range of machinery that will accomplish all basic and ancillary work. When drawing up plans for the mechanisation of livestock farming, therefore, provision must be made for supplying a full range of production equipment and machinery to all types of livestock farm premises coming into operation. In the case of existing livestock farming units, on which at the moment only certain production processes are mechanised, provision should be made for supplying the necessary additional machinery if the layout of building so allows.

The composition, location and operation of a full range of production equipment and machinery depends on the type and size of a farming unit, the means of looking after and rations used in feeding livestock, planned technological systems for the preparation and distribution of feed, manure collection, milking and other production processes. Before the demand for machinery can be determined, therefore, work must be done on determining the optimum size and specialisation of livestock farming units on the basis of a rational concentration of different sectors of livestock farming and the elimination of the many small farms and isolated livestock sheds that exist on some farms. Apart from the machinery that has to be installed inside individual farm buildings, the demand for machinery and equipment for use by the whole farm must also be considered: for example, multi-purpose crushers, straw and silage choppers, mixed feed processing units, mower-crushers, conveyor-loaders, etc. Technological supplies in a planned

year or period must be kept within a farm's financial possibilities.

Complex mechanisation is accompanied by the *electrification of agriculture*. Plans for the electrification of collective and state farms provide for the extensive use of electricity in production and in the domestic sphere. All collective and state farms must be supplied with electricity predominantly from the national grid and power stations.

Detailed calculations of demand for electricity for agricultural production purposes are best carried out using area technological sheets relating to the complex mechanisation of various sectors of production and showing machinery and other mechanical devices and apparatus that run on electricity.

Plans for the installation of electric motors on collective and state farms must correspond with plans for the supply of agricultural machinery and equipment that is already fitted with electric motors and with plans for the supply of electric motors to be installed on existing machinery. It is necessary to check the correctness of estimates of demand for electricity for production purposes by comparing growth in this demand with the total capacities of electric motors installed, multiplied by the average number of hours that an electric motor is used in one year (the USSR Central Statistical Board gives this as 800-1,000 hours).

The plans also make provision for the use of electricity in actual technological production processes that act directly upon animals and plants, in the processing of seed, feed-stuff and other products. In particular, the extent to which ultraviolet and infrared irradiation of animals and poultry, artificial lighting, ultrasonic waves and high-frequency current will be used must all be determined, as well as the demand for special lamps, equipment and apparatus.

Preliminary plans for the complex mechanisation of production and estimates of demand for agricultural technology for that purpose must be corroborated by the requisite calculations and supporting data regarding the economic efficiency of planned measures. Savings on equipment and labour brought about by such mechanisation are calculated, as well as recoupment periods for capital expenditure on measures connected with the mechanisation of agriculture.

The *chemicalisation of arable and livestock farming* is an important factor in strengthening and developing the material and technological basis of agriculture. Increased mineral-fertiliser production has already made it possible to supply mineral fertilisers for the entire crop of cotton, sugar-beet, staple flax and for other industrial crops, and to increase considerably their levels of application to grain and fodder crops.

Creating the basis for the rational use of fertilisers, i.e., their application on those farms where they can produce a maximum economic effect, is a most important planning task relating to the agricultural use of chemicals.

The demand for fertilisers is determined in terms of standard mineral fertilisers and active substances for each type of fertiliser separately—nitrogenous, phosphorous, potassium, phosphate and boric (Table 4).

Table 4

**Determining Demand for a Particular Type
of Mineral Fertiliser
(conventional figures)**

Crops	Sown area, 1,000 hectares	Including fertilised area, 1,000 hectares	Rate of application, 100 kg per hectare		Demand, 1,000 tons	
			Standard mineral fertiliser	Active substances	Standard mineral fertiliser	Active substances
Winter wheat . .	100	60	2	0.5	12	3
Spring wheat . .	200	100	2	0.5	20	5
Potatoes	10	10	5	1.25	5	1.25
Total	...	...	...	...	...	...

Rates of application are fixed, taking into consideration recommendations from local research and experimental establishments, the experience of successful farms, the projected fertilisation system, crop structure, and local soil and climatic conditions. When levels of fertilisation are being prescribed, provision is made for a correct combination of mineral and organic fertilisers, the liming of acid soils, etc.

While estimates of the demand for mineral fertilisers are being made by each farm and production (collective and state farm) management board and, on the basis of these estimates, of demand at district and republican level, specific measures must be devised at the same time for correct storage, transport and application so that losses will be eliminated.

In agricultural planning, a great deal of attention must be paid to the widespread implementation of preventive measures for protecting crops and animals from pests and diseases.

For the control of weeds, provision is made for the greatly extended use of herbicides and a wider variety of them. As a first stage a number of measures have to be worked out—in particular, the training of crop protection specialists. The timely use of chemicals for crop protection largely depends on the rational and early ordering of sprays and mechanical applicators, etc.

It is recommended that calculations of planned demand for these chemicals take into account local conditions regarding average standard practice as recommended by the State Commission for the Chemical Control of Plant and Animal Pests and Diseases.

Investment by the state and by collective and state farms is the economic basis for improving the material and technological basis. In order to accelerate agricultural development along intensive lines, capital investment must, in the first instance, be used for the following measures:

... completion of the complex mechanisation of agricultural production in accordance with conditions in particular areas of the country;

... chemicalisation of arable and livestock farming;

... carrying out of land improvement and other measures for increasing the productivity of all agricultural land on collective and state farms;

... organisation of specialised farms to produce agricultural products on an industrial basis (intensive poultry farms, factory methods of fattening livestock, specialised state farms, etc.);

... growth in production assets and assets for cultural and social purposes.

4. CALCULATION OF ECONOMIC INDICATORS FOR THE AGRICULTURAL DEVELOPMENT PLAN

All planning calculations relating to agriculture, from collective and state farms to the State Planning Committee, must be made with great care on the basis of such economic indicators as the growth of gross output, increase in labour productivity, level of cost of production of agricultural output, gross and net income from agriculture, profitability, money and income of agricultural enterprises.

Gross output of agriculture is made up of the output of arable and livestock farming. Arable output includes products obtained from the cultivation of grain and industrial crops, potatoes and other vegetables, melons, fodder crops, hard and soft fruits and other crops. Arable output also includes changes in the volume of work in progress and inputs in the cultivation of perennial crops. Livestock output includes the herd increase, growth and weight gain of cattle, poultry and other types of livestock, and products obtained from the economic use of animals (milk, wool, eggs, etc.), and the output of fur farming, bee keeping, raw silk production and fisheries.

Gross agricultural output does not include products obtained from the slaughter of livestock (meat, hides, etc.), from the processing of agricultural output (vegetable oil, wine, etc.), or from fishing, hunting or forestry.

Gross agricultural output in money terms is calculated for a calendar year at comparable and current prices for the whole agriculture of the Soviet Union and the Union republics, broken down by type of farm. The indicator of gross output, calculated at comparable prices, is used to determine the overall growth rate in the volume of gross output and variations in it by type of farm, sector and product. The gross output indicator is also used to determine the characteristic curve in production growth per unit of land area.

In addition, when agricultural development plans are being drawn up, gross output is calculated at current prices. This indicator is necessary to determine the total volume of social product and the proportion of national income realised in the agricultural sector, and to calculate the incomes

of the farming population. Gross output at current prices is determined separately for each type of farm and for each different end-use of output for each type of farm.

Each type of output is allocated in physical terms in accordance with the planning input-output tables for agricultural products and is estimated at these prices according to the following end-uses:

- sales to the state, including repayment of loans and transactions in kind;

- sales on the collective farm market, and other sales;

- sales and transfers within a village (including sales to collective farm workers on collective farms using money payment for labour);

- non-marketable output, broken down into consumption of seed, feedstuffs, and into personal consumption, industrial processing, losses, stocks, and, in the case of collective farms, payment in kind to its members for work done and as welfare payments.

Material production inputs are also estimated at comparable and current prices in drawing up a plan. Calculations of inputs are made for a calendar year, separately for each type of farm. The basic items of material inputs are grouped together under the following heads:

- agricultural products (seed, feedstuff and similar inputs);

- industrial products (mineral fertilisers, fuel and lubricants, industrially produced feeds and other material inputs);

- depreciation of basic production assets used in agriculture.

To determine *gross income*, material inputs are deducted from gross output, both calculated at current prices.

Net income generated in agriculture is arrived at by deducting actual expenditure on wages from gross income.

In order to determine *profitability of agricultural production*, net income generated in agriculture must be set against the total costs of production (i.e., inputs of materials and labour).

All these indicators must be calculated at all levels of the plan, from the agricultural enterprise to the State Planning

Committee, for all branches of agriculture and for the basic products.

The calculation of the *monetary income and expenditure of collective farms* is of great importance in the planning of collective farm production. This is due to the fact that collective farms, unlike state enterprises, finance their entire operations, including payment of wages, using their own or borrowed funds. Collective farm budgets should be drawn up in the regions, republics and for the country as a whole, in order to balance the income and expenditure of each collective farm.

These budgets are drawn up along the following lines:

Money income (total):

1) from the sale of output: a) to the state in accordance with the plan for state procurements; b) to cooperative and other organisations (apart from sales under the plan for state procurements); c) on the collective farm market; d) to collective farmers as money wages;

2) other money income (including the value of farm-produced materials and products used for investment and major repair) and other income from livestock farming.

Money expenditure (total):

1) production expenses (including general, and administrative and management expenses, wages, and insurance), including: a) inputs of materials and money on mineral fertilisers, purchases of seed and fodder, fuel and lubricants, maintenance, etc.; b) depreciation of basic production equipment; c) insurance; d) total money wages for payment of collective farmers (including additional payments to chairmen and specialists from collective farm funds); e) holiday payments; f) total wages for the payment of hired and seasonal workers;

2) obligatory payments to the state (total), including income tax and contributions to the centralised social security fund for collective farmers;

3) replenishment of social assets (total), including circulating assets, indivisible (fixed) assets, excluding depreciation, cultural and social funds, collective farmers' welfare and social security funds, etc.

5. TASKS RELATING TO THE OPTIMISATION OF PLANNING AGRICULTURAL PRODUCTION AND AGRO-INDUSTRIAL COMPLEXES

A growth in productive forces, intensification of the social division of labour and expanding inter-sectoral links on a macro-economic level, all make it increasingly pressing that optimal methods and models are used for planning agricultural production and agriculture-linked industries.

Optimal planning means that economic-mathematical methods for solving problems are essential. Linear programming is the most modern and well-developed technique at the moment. It is already used in practice for preparing the initial data used in drawing up agricultural development plans for the country as a whole, for individual republics and economic areas, as well as for production development plans for individual agricultural enterprises.

In particular, linear programming is being used to solve problems relating to the rational location of agricultural production in the different areas of the country and to specialisation by particular regions with a view to the most effective use of available land and manpower resources. Thus, in 1970, the staff of the All-Union Agricultural Cybernetics Research Institute and the Institute of the Economics and Organisation of Industrial Production, attached to the Siberian Branch of the USSR Academy of Sciences, carried out a major experimental project on the optimal location of agricultural production in 26 economic areas of the Soviet Union. Calculations showed that by 1985 the best location of production among the areas would produce an increase of 37 per cent in actual gross output per rouble of operating costs and increase the growth rate of agricultural output by a factor of 1.5.

Linear programming techniques can also be used to solve other problems relating to the optimisation of agricultural development. The best developed of these include: the optimal distribution of mineral fertilisers, optimal use of investment for particular purposes, and determining the best structure for a machine and tractor stock. These problems can be successfully dealt with on a country-wide scale, for a particular republic, territory, region, district, down to in-

dividual farm level. There are a whole number of problems that are of prime importance only to specific collective and state farms. These include, in the case of livestock farming, establishing an optimal herd structure and an optimal composition of feed rations for livestock and poultry, and, in the case of arable farming, the introduction of the best crop rotation, etc.

With the increasing integration of social production, however, where agricultural development is increasingly dependent upon other agriculture-linked sectors of the economy, such optimisation is no longer adequate. Increased efficiency of agricultural production on the basis of its continuous industrialisation cannot be effected unless all the sectors of the economy that are involved in the production, processing and distribution of agricultural output develop in conditions of closer coordination. Analysis shows that, given the same financial, material and technological resources that have been allocated to agricultural development over the past few years, there is a real possibility of achieving a much greater economic effect.

These possibilities are not yet being fully realised, primarily because various production problems are not always dealt with in a complex manner. This is because planning of the production of the different material and technological resources used in agriculture is split up between the different sponsoring ministries and departments, and is not sufficiently coordinated. There is even less control over the fulfilment of planning tasks in allied sectors and industries as regards the complex solution of engineering and technological problems.

The following example will illustrate the situation. In the years 1965-1970, delivery of mineral fertilisers to agriculture increased by 70 per cent. Production of machinery to apply mineral fertilisers increased by only 34 per cent over the same period.

Such a relationship between the levels of development of these two industries supplying goods to agriculture came about in spite of the fact that collective and state farms are suffering from an acute shortage of machinery for the chemicalisation of arable farming. The same situation obtained in 1971. Collective and state farms ordered 42,000 machines

of a particular type for spreading mineral fertiliser. The manufacturers, however, had planned to produce only 14,000 of these machines. This naturally resulted in losses of fertiliser, its unsystematic use and, consequently, a less than optimum increase in productivity.

Coordination between the development of agriculture and that of the industries that supply it with producer goods, process its output and deliver it to the consumer, demands that all these sectors be combined in one agro-industrial complex. Analysis of the development of inter-sectoral links in agriculture shows that the following sectors (or subsectors) of the economy make up an agro-industrial complex: agriculture; the section of the chemical industry producing mineral fertilisers, herbicides, pesticides and other such products; manufacturers of agricultural machinery; rural transport and roads; rural production construction; land improvement; the food industry; light industry; rural housing and cultural and amenities construction; semi-finished products, trade and the supply of materials and technological equipment.

As can be seen from the above list of industries, they are all combined for a common purpose, the production of foodstuffs and consumer goods manufactured from agricultural raw material. They are linked by virtue of the consecutive and interdependent nature of their technological processes, in which the end product of one industry is the intermediate product for another, or for the complex as a whole. A number of sectors in an agro-industrial complex (transport and roads, housing and cultural and amenities construction), although they do not create an intermediate product, do, in fact, provide the necessary conditions for the normal process of reproduction.

An increased growth rate in agricultural production requires that a programme for the long-term development of an agro-industrial complex as a whole is drawn up coordinating the indicators for all its elements in a single input-output calculation.

All the elements going to make up a complex must enjoy equal rights and build up their own activity and relations with other associations, both within the complex and outside it, on a profit-and-loss basis. In order to optimise the

development of each of the sectors making up an agro-industrial complex, a whole system of economic-mathematical models is used, which take into account their specific features.

An agro-industrial complex is an integral part of the national economy. Its financial independence must, therefore, be coordinated with centralised planning. The organisations concerned in planning an agro-industrial complex must be provided by the state planning bodies with the principal plan indicators, in physical or value terms, that determine the end target for the development of the complex. These indicators, issued in the form of directives, will contain the necessary information regarding the economic interests of society, and this will make it possible to carry out social reproduction in a rational way. In addition to this, the management bodies of an agro-industrial complex must have sufficient power for them to deploy all available resources and put them to optimum use.

Optimising the development of a complex consists in calculating and including in the plan those variants of resource allocation among sectors in the complex and in determining that rate of development that will secure maximum final output by the complex necessary for the economy in the light of the common goal adopted.

This approach to optimal planning of the development of an agro-industrial complex presupposes two stages. First, on the basis of an aggregate optimal model of macro-economic development, the funds of global resources, especially those in short supply (investment, manpower), to be allocated for the development of the complex are determined. In the second stage, the problem of the most efficient distribution of allocated resources among the elements in the complex is solved.

Use of a model permits making decisions determining the most rational development of sectors in an agro-industrial complex from the point of view of increasing consumption and with due regard for existing and prescribed conditions.

PLANNING TRANSPORT AND COMMUNICATIONS

1. THE BASIC TASKS OF TRANSPORT PLANNING

Planning the work and development of transport is of great importance in the general system of Soviet macro-economic planning. Transport combines all the sectors of the economy and economic areas into one economic whole. The production process in a sector is completed only when transport has delivered its output from the point of production to the point of consumption.

The basic tasks of transport planning are: a decrease in transport costs, the development of transport on the basis of the latest achievements of science and technology, the distribution of traffic among the different modes of transport in accordance with the technological and economic features of each one, the establishment of optimal economic links between enterprises and the improvement of transport management.

When planning transport work, proportionality must be maintained between the development of transport and of the economy as a whole, i.e., the volume of traffic must correspond to the scale of industrial and agricultural production, the development of foreign and domestic trade, the development of economic and cultural ties, and the regional location of productive forces. Correct proportions must also be maintained in providing transport with its requirements regarding materials and equipment (locomotives, vessels, motor vehicles, fuel, etc.).

In a socialist society all modes of transport constitute a unified transport system. If correct proportions are main-

tained in the development of the different modes of transport, the entire transport system becomes more efficient and demand for transport is satisfied to a greater extent.

All elements in each means of transport must correspond to each other—the traffic-handling capacities of railway lines and stations, fleet and port capacities, the capacity of repair depots and the amount of repair work, etc. This enables maximum use to be made of each means of transport, ensures continuous operation and increases the efficiency of basic transport facilities and investments.

Plans for the development of transport incorporate several types of quantitative and qualitative indicators for the different modes of transport:

- indicators that determine the volume of transport work—freight and passenger turnover and despatch of freight, with separate indicators for the main types of freight; in the case of sea and river transport, earnings from overseas shipments are established;

- indicators relating to the use of transport facilities (locomotives, freight cars, motor vehicles, vessels, aircraft);

- indicators relating to capital construction: the volume of centralised investment and building and installation work, the commissioning of productive capacities (new roads, ports, plants and other capacities);

- indicators relating to the application of new techniques (new technological processes, the complex mechanisation of labour-intensive work, automation of production);

- indicators relating to the supply of materials and technical equipment (rolling stock, fuel, materials, equipment and spare parts);

- indicators relating to labour and finance (total wages bill, total profit and profitability, budgetary payments and allocations, decreases in prime costs of shipments).

2. PLANNING FREIGHT TRAFFIC

The plan for freight traffic is a basic part of the plan for the development of transport. On the basis of the required volume of traffic, the demand for rolling stock, fuel and materials is determined, the size of the work force and income

and expenditure is established, and measures for developing transport and the volume of investment are outlined.

Long-term, annual, or current, and operational (quarterly and monthly) plans are drawn up for the different types of freight traffic. In all instances, the volume of industrial and agricultural production, capital construction, the supply of materials and technical equipment, foreign and domestic trade, are all used as initial data in determining the volume of freight traffic.

Long-Term Planning

Long-range plans for freight traffic are drawn up, which take into consideration the projected location of the main sectors of industry and agriculture and the development of foreign economic ties.

The main indicator for future freight traffic is freight turnover for all means of transport, expressed in ton-kilometres (or, in the case of transport by sea, in ton-miles). Freight turnover depends on two magnitudes: the quantity of freight and the distance of its haul.

The basic technique used in determining the volume of freight traffic are input-output tables of production and consumption. What are known as transport coefficients, i.e., the ratio of the volume of traffic of particular goods to the volume of output,* are also used in the preliminary, approximate calculations. As these coefficients are determined from figures taken from a preceding period, however, they are of little use for establishing the exact volume of traffic in the future.

When long-term plans are being formulated, tables are drawn up for the basic types of industrial goods—coal, coke, oil and oil products, ore, ferrous metals, timber, building materials, mineral fertiliser and grain—which make up the bulk of traffic.

Available sources of the goods in question, consisting mainly of the volume of output in the planned period, stocks held at the beginning of the planned year and additions from

* Part of the output produced is consumed on the spot and is not, therefore, included in the volume of freight traffic.

other sources, are included in the table. When the amount to be transported is being determined, the following are excluded: the part of output that is consumed at the points of production, stocks held at the end of the planned year, and output moved by in-plant handling systems. When the volume of traffic handled by different means of transport is being determined, the double-counting of shipments, that arises when goods are transferred from one mode of transport to another, is taken into consideration. A schematic input-output table is shown in Table 5.

Table 5

Schematic Input-Output Table of Freight Traffic

	Actual figures for period under review	Current period		Draft for planned period
		Plan	Expected fulfilment	
1. Sources				
Production				
Stocks held at beginning of planned period				
Other sources (imports, etc.)				
Total				
2. Output not subject to transportation				
Local consumption				
Stocks held at end of planned period				
In-plant transfer				
Total				
3. Subject to transportation (1-2)				

The total volume of traffic in building materials can be determined on the basis of a standard rate per million roubles' worth of building and installation work.

The volume of foreign freight traffic by sea or river is calculated on the basis of long-term contracts and import-export plans.

In the case of road haulage, the volume of freight traffic is determined on the basis of standard shipments of freight in tons per million roubles' worth of marketable (gross) output of industry, agriculture, building and installation work and trade. In long-range planning, these standards are established with due regard for actual figures over a period of not less than three years, and for projected changes in the structure of industrial production, construction and trade.

The second factor in freight turnover is the average length of haul, which is the average weighted distance that different cargoes are carried from the point of loading to the point of unloading. Cutting down the length of haul is a powerful means of cutting the country's transport costs. The shorter the length of haul, the smaller is the proportion of transport costs in the cost of producing the transported output, the less the time that output spends in the process of circulation, and the shorter is the turn-round time for rolling stock. The demand for rolling stock for carrying the same volume of freight therefore falls, and investments for the acquisition of rolling stock, and the costs of carrying freight decrease. Cutting down the length of haul by rail by one kilometre reduces the transport costs by approximately 10 million roubles per year.

At the same time, the average length of haul must not be increased or decreased arbitrarily. It depends on a number of factors: the territory of the country, the location of the productive forces in the different areas, the level of specialisation and cooperation in production, the degree of proximity of industry to sources of raw materials, fuel and consumption areas, the development of inter-regional and foreign economic ties, and the development and location of the transport network. It also depends on improvements in the planning and organisation of sales and supplies, and qualitative improvements in the formulation and execution of plans for the directional distribution of traffic.

The length of haul by particular modes of transport is affected by the level of development in other modes of trans-

port. Thus, the development of long-distance, pipeline and river transport results in a decrease in rail haul, while the development of motor-vehicle traffic, which is used for short distances, increases the proportion of long-distance haulage by rail.

To determine haul distances, regional input-output tables of production and consumption are drawn up showing sources of output in a given area, demand for that output, and any surplus or shortage in relation to the needs of the area. These tables are used to establish exporting areas, where there is a surplus of a particular output, and importing areas, where there is a shortage. Areas of consumption must be linked with areas of production in such a way as to ensure minimum total country-wide expenditure on production and transport.

In order to select optimal variants for linking suppliers with consumers, linear programming techniques are used to solve transport problems.

A linear programming transport problem may be roughly formulated in the following way. There are several suppliers of similar or substitute goods with a specific volume of production for each base station; and there is a specific number of consumers with known consumption capacities. The distances between the points and the transport costs from each point of production to the point of consumption are also known. The plan for linking suppliers with consumers must be drawn up in such a way as to minimise the total volume of freight traffic in ton-kilometres, or the total transport costs.

Economically efficient transport links are determined for different types of freight and for different areas of production and consumption, as well as for different points of mass production and consumption. As a result, it is possible to establish specific exporting and importing areas for each type of output, i.e., tables of inter-regional traffic.

This "chessboard" table shows the geography of the marketing and consumption of various goods. Total projected deliveries to all areas must correspond to total sources in the areas. The railways use such a table in order to coordinate shipments inter-regionally, and it serves as a basis for determining the directional distribution of freight

traffic, or freight flows, as well as average haul distances.

The total volume of freight turnover is obtained by totalling the freight turnover of particular goods (Table 6).

Table 6

Calculation of Total Rail Freight Turnover

Type of output	Traffic, million tons	Average distance, km	Freight turnover, 1,000 million ton-km
Coal and coke	583	681	396.9
Oil	222.2	1,262	280.4
Ores, various	192.2	584	112.2
Ferrous metals	144.9	1,115	161.6
Timber	149.2	1,616	241.0
Firewood	22.1	737	16.3
Minerals and building materials	572.2	391	223.7
Mineral fertilisers . . .	42.9	1,083	46.5
Grain	84.1	970	81.6
Subtotal	2,012.8		1,560.2
Other goods	402.5	968	390.0
Total*	2,415.3	807	1,950.2

* Average length of haul of other goods is determined from actual figures taken from the preceding period. Average length of haul for all goods can be obtained as the average weighted figure for length of haul of particular goods, or as a quotient obtained by dividing total freight turnover by the volume of goods to be transported.

The rational allocation of traffic between the different modes of transport is an important aspect of long-term planning. It consists in the specialisation of different means of transport [in particular types of traffic; the establishment of the most efficient coordination between different modes of transport and the most efficient use of each of them.

Selection of a mode of transport is based on the calculation of minimum inputs of social labour in the delivery of goods from the point of production to the point of consumption.

The allocation of freight traffic between the different modes of transport is influenced by such factors as the volume of traffic, the type of goods and the length of haul. The following indicators are usually used in selecting a particular mode of transport: 1) operating costs, 2) investment, 3) labour inputs, 4) metal inputs, 5) fuel consumption, 6) time of transportation, and 7) speed of delivery. The carrying capacity of each means of transport is also taken into consideration.

Current Planning of Freight Traffic

The creation of a unified planning system for all modes of transport, both at the central and on a local basis, is one of the most important conditions for improving the quality of freight traffic planning. Such a system should lay down the order in which freight traffic plans are drawn up, agreed and approved, as well as the period they cover.

The total volume of freight traffic is taken to be the total volume of traffic in the different types of goods, which is established on the basis of draft plans for production, capital construction, the supply of materials and technical equipment, and trade. Tables are drawn up to illustrate the demand for transportation of the principal types of goods. In the case of the remaining types of goods, which make up approximately 20 per cent of the total volume of freight traffic, demand is determined on the basis of the difference in the volume of production as compared with the period under review.

Traffic is allocated to the different means of transport by the planning bodies and goods consignors, in conjunction with the transport organisations (railways, steamship lines, road haulage trusts). Schematic diagrams showing the normal routes for freight flows are used to make a rational allocation of traffic among the different modes of transport, and avoid cross-hauls or unnecessarily long, duplicate or

other irrational journeys. Normal routes for freight flows are rational routes for the movement of particular goods, and they are established on the basis of the existing or planned location of production and consumption of a given type of goods, as well as the location of the transport network with a minimum volume of transport operations and minimum transport costs. These schemes are drawn up on the basis of regional input-output tables of production and consumption and on the basis of a rational organisation of inter-regional traffic. They show loading points (railway stations or, in the case of sea-borne traffic, ports) and the final unloading points of the goods.

The mode of transport for handling freight traffic is selected on the basis of current tariffs for each means of transport, taking into account all additional costs of loading and unloading operations, the movement of goods to and from main-line routes, as well as the safe carriage of the goods and the speed of delivery. Additional costs, over and above the main-line tariffs, can exert a decisive influence on the selection of transport means for freight, especially over short distances.

Shipment by several modes of transport is called *mixed traffic*. If this traffic is covered by one shipment document, with the freight being transferred from one mode of transport to another without the participation of goods consignor or consignee, it is called *direct mixed traffic*.

Annual plans for direct mixed traffic are drawn up separately for rail-river, rail-sea and direct transport by ship (river-sea). This transport system is of great convenience to the goods consignor, who deals with one mode of transport only, irrespective of how many modes of transport may be involved.

The development of a rail-ship-road transport system makes it possible to direct the freight traffic flow to the most appropriate routes, to ensure that the operations of allied modes of transport are technologically uniform, and to establish the most efficient inter- and intra-regional links on a country-wide scale.

Mixed traffic is economically justified in cases where total operating costs (including additional costs and losses of goods incurred in the course of transshipment from one

mode of transport to another) are less than the total costs of shipment by one of the possible means of transport.

Cuts in costs of transshipping freight from one mode of transport to another and the overloading of particular modes of transport in periods of seasonal traffic broadens the scope for the economically expedient utilisation of mixed traffic. The use of containers and packaging is of particular importance in reducing the costs of transshipment operations and in the development of mixed traffic.

3. PLANNING PASSENGER TRAFFIC

The volume of passenger traffic depends on the size and mobility of the population. Many factors influence mobility: changes in the ratio between the urban and rural population; the location of productive forces; the economic exploitation of natural resources in new areas; the rise in the material and cultural level of working people; the growing network of holiday homes and sanatoria; length of the working day and holidays; the development of the communications network, external economic and cultural ties, etc.

A proportion of passenger traffic can be determined by a direct calculation depending on an expansion in the number of health resorts, holiday homes, colleges, large international exhibitions, business trips, manpower recruitment drives, etc. Calculations show, however, that such passengers comprise approximately only a quarter of the total volume of passenger traffic. To determine the volume of traffic accounted for by other passengers, statistical analysis and research techniques are used. All these calculations help to establish population mobility, i.e., the number of per capita passenger-kilometres per year.

The volume of passenger traffic carried by the different modes of transport is established in accordance with the special features of each mode of transport and taking demand into consideration. The special features of the different modes of passenger transport that are taken into account when passenger traffic is being planned include its popularity and its dependence on climatic conditions and its speed.

To establish the scale of traffic on particular routes, a study is made of passenger traffic flow and its regularity, as well as the availability of road, railways, etc., and the traffic-handling and carrying capacities of each mode of transport.

4. PLANNING THE DEVELOPMENT OF THE MATERIAL AND TECHNOLOGICAL BASIS FOR TRANSPORT

The development of the material and technological basis for all means of transport entails its technological modernisation, as well as the complex mechanisation of labour-intensive operations and automated control.

In transport, technological progress is reflected above all in higher speeds and the increased carrying capacity of the various means of transport.

Plans for the development of transport lay down: its restocking with different means of transport (locomotives, wagons, vessels, motor vehicles, aircraft); the improvement and reconstruction of the existing network by a change-over to new forms of traction, and the building of new lines and stations; the development of a fleet of pilot tugs at sea and river ports; the equipment of ports, stations and airports with mechanical aids, the development of repair facilities and the automated control of transport operations (automatic block system, centralisation of traffic control, automated control of mechanical aids in shipping, etc.); and the building of new railways and roads, ports and pipelines.

The most important tasks involved in planning the material and technological basis are:

the carrying of freight and passenger traffic in accordance with the planned growth in the productive forces and their location in the different areas of the country;

the creation of the necessary traffic-handling and carrying capacities;

proportionality in the development of all modes of transport as components in a unified transport network and the elimination of disproportions within each mode of transport;

an overall acceleration of technological progress in all modes of transport, complex mechanisation and automation

of transport operations, increased labour productivity and lower transport costs.

The basic synthetic indicators regarding the use of transport facilities vary from one mode of transport to another. In the case of rail transport, the indicator is the average 24-hour productivity of a freight car in the total stock available for use (calculated in terms of two-axle freight cars) expressed in ton-kilometres (net). The average 24-hour productivity of a locomotive in freight service is expressed in 1,000s ton-kilometres (gross). The basic indicator for transport by sea is the average 24-hour productivity of one-ton freight-carrying capacity of a vessel, expressed in ton-miles, with dry and liquid cargo vessels dealt with separately. A similar calculation is made for river transport, expressed in ton-miles and with self-propelled and non-self-propelled vessels dealt with separately. Road transport indicators are the productivity of an average 24-hour vehicle-ton per year (or, in the case of work by the hour, per hour); the use of one average scheduled bus or seat per year, expressed as the number of passengers or passenger-kilometres; and the use of one average scheduled taxi per year in 1,000s paid kilometres.

These indicators are obtained by dividing the work done (or projected) by the number of transport units or their total capacity, weighted over time (ton-kilometres or ton-miles by ton-days in operation or stock available for use).

For planning the work of each mode of transport, there are also a number of techno-economic indicators regarding the use of transport facilities.

In the case of railways, such indicators include the turn-round time of a freight car, average 24-hour run of a locomotive, average weight of a freight train (gross), axle load of a freight car, and section and operating speeds (although these are in fact elements in a freight car's turn-round time). The most important of these is the turn-round time of a car, i.e., the time between one loading of the car and the next.

In the case of sea transport, it is the average length of the operating period in 24-hour units, the operating speed of vessels (miles per day), and the utilisation of freight capacity (as a percentage). In the case of river transport, the follow-

ing indicators are used in addition: the productivity of one h.p. of a tug-boat fleet and the coefficient of the running time of a vessel expressed as the ratio of ton-days of a run to the total ton-days (for completed runs).

In the case of road transport, the coefficient of use of the motor vehicle fleet is also determined. This shows the ratio of working vehicles to the total fleet (as a percentage). The coefficients of utilisation during a run by lorries, showing the ratio of a run with a load to the total run and showing empty runs, are also determined.

In the case of air transport, the main indicator is the productivity of an average scheduled aircraft (or helicopter) per year, and the hourly productivity in reduced ton-kilometres.

The demand for railway rolling stock, vessels, motor vehicles and aircraft in the planned period is determined on the basis of the projected volume of traffic, taking into account progressive indicators for the use of rolling stock. Calculations are made by means of tables of rolling stock, vessels, motor vehicles and aircraft. These tables show existing numbers at the beginning of the planned period, withdrawal and replenishment over the planned period (supply), existing numbers at the end of the planned period and average numbers over the planned period.

The preliminary data for formulating a plan containing measures concerning the strengthening and development of the transport network are freight and passenger traffic flows in the long-term period (number of freight loads and passengers transported on a given line in a year), calculated by routes or areas of the country. Projected growth in the freight and passenger traffic flows is compared with existing traffic-handling and carrying capacities, and it is established to what extent the growing volume of traffic is carried by the use of the potentialities of existing lines, the application of new techniques and advanced technology, and the rational allocation of traffic among the different modes of transport. Thus, for example, the change-over of railways to electric and diesel traction enabled significant economies in fuel and reductions in operating costs to be made.

In addition, the exploitation of new sources of raw material and fuel, and the opening-up of new industrial and

agricultural areas is preceded by the opening-up of the areas to transport and, consequently, the building of new lines. Plans for the development of the transport network are established on the basis of techno-economic calculations and the comparison of particular variants for carrying the growing traffic. When these variants are being compared, comparisons are made of additional investment and annual economies in operating costs.

A unified transport network must harmoniously combine all modes of transport and long-distance and local lines of communication. When transferring freight or passengers from one mode of transport to another, it is necessary to keep the costs down and the operations simple, and this involves the integrated development of transport junctions and installations, coordinated parameters of rolling stock, of package and of loading and unloading facilities for all modes of transport.

5. PLANNING COMMUNICATIONS

A development plan must satisfy macro-economic and personal consumer demand for communications facilities by the improved use of the existing services, their further development and improvement, the introduction of the latest techniques, complex mechanisation and automation and the creation of a unified automated telecommunications network.

The planning of electric and postal communications is based on the overall evaluation of the location of the productive forces, the specific development trends in the different areas of the country, and on an analysis of the routes and volumes of the postal and telecommunications traffic (telegrams, long-distance telephone calls, postal correspondence, etc.).

Plans for the development of communications facilities and broadcasting include the following main indicators:

- volume of the communications traffic (in 1,000s roubles);
- volume of centralised investment and commissioning of capacities—long-distance cable and radio-relay lines (in 1,000s km), radio and television broadcasting stations (with a power of 1 kW and over) and city telephone exchanges (per 1,000s subscribers);

length of telephone circuits in long-distance communications, capacity of urban and rural telephone exchanges, including automatic exchanges, as well as the number of one-, two- and three-channel television stations with a power of 1 kW and over.

Under the new system of planning, the most important indicators in the plan for the development of communications are income, profit and profitability.

Volume of communications traffic is determined by the services provided by the communications bodies to the general public, the state, cooperative and social organisations and to enterprises in the form of telegraph and telephone telecommunications (by cable and radio), television, postal despatch and delivery, as well as the provision of telecommunications circuits on lease, etc. The planning task relating to the volume of communications traffic is expressed in money terms and is determined by the volume of services in physical terms and in accordance with the monetary estimates established by the USSR Ministry of Communications.

A number of indicators—postal, telegraphic services, etc.—are used to determine communications services in physical terms. They are calculated on the basis of the projected development and modernisation of communications facilities, the growth rate of services in preceding years and the further increase in demand for all communications services. Demand for these services is itself dependent on changes in the location of the productive forces in the country, population growth and the growing cultural and everyday needs of the working people.

Demand for communications services is determined on the basis of the volume of these services in the base year and the coefficient of growth in services and the size of population in the planned period. The coefficient of growth in services is calculated as follows: for letter post, dependent on growth in the number of workers and employees; for parcel post, on the basis of retail trade turnover; for money remittances, on the basis of increased personal money income, etc.

Such indicators as "letters", "parcels" and "money remittances" include everything despatched by state, cooperative and social organisations, establishments, enterprises and

individuals, as well as remittances of trading receipts and money remittances sent by taxation offices. The indicator "periodicals" includes publications sent through the post on subscription and distributed through a retail network. When the indicator "number of telegrams" is being calculated, paid telegrams accepted at a telegraph office or through special agencies (telegram messengers or rural postmen), by telephone or subscribers' telegraph apparatus, are taken into account.

Long-distance telephone calls are determined from the total of paid telephone calls taking place between long-distance telephone exchanges and switchboards. In addition, calculations are made relating to the development of office communications: the capacity of office exchanges, the capacity of internal telephone exchanges belonging to state and collective farms, and the number of state and collective farms that have such facilities.

Plans for the development of office communications are drawn up by the Union republics, ministries and departments, taking into account the requirements of the unified automated communications system in the country.

The indicators for the development of communications facilities are established by totalling the facilities existing at the end of the base year and their projected growth in the planned year.

CHAPTER IV

PLANNING THE SUPPLY OF MATERIALS AND TECHNICAL EQUIPMENT

The plan for the supply of materials and technical equipment is an integral part of the macro-economic plan. It coordinates the production and consumption of output for production and technological purposes, and lays down the proportions for their allocation in the national economy. Obviously, in the process of reproduction of the social product, each enterprise and production association, and each sector of material production not only produces a particular type of output, but also consumes essential producer goods—raw and other materials, fuel, equipment, etc. On the other hand, in selling or distributing what they produce, enterprises and production associations supply the state and satisfy public and individual needs in a socialist society. Demand for producer goods is met through the channels of material and technical supply, while demand for consumer goods is met through the Soviet trade network.

The supply of materials and technical equipment to the economy is the responsibility of the state system of supply, headed by the USSR State Committee for Material and Technical Supply. It functions in close contact with the USSR State Planning Committee, the various sponsoring ministries and government departments, as well as with republican and local planning and economic bodies.

The creation of such a system in 1965 was brought about as a result of the increased scale of social production in the

Soviet Union, the increasing complexity of its sectoral structure and inter-sectoral economic linkages, the adoption of the sectoral principle of management in industry and construction, and the greater operational independence of enterprises under the economic reform. With the formation of this country-wide system, material and technical supply was organised as an independent economic sector, responsible for serving all other sectors of the economy. The essential feature of this system is that it stands at the point of intersection between the vertical and horizontal management of the economy, and functions as a centralised system for regulating flows of materials within the economy.

The state system for the supply of materials and technical equipment is a Union republican system, organised on territorial-sectoral principles and embracing both central and regional supply and sales bodies. It functions on the basis of full cooperation between the Union state committees for supply and sales, and for complete equipment supply in the Centre, on the one hand, and the main and regional material and technical supply bodies in the Union republics and different areas of the country, on the other. The system serves more than 130,000 industrial, construction and other enterprises and organisations as consumers, irrespective of which government department they come under. In the case of oil products, it serves all consumers throughout the national economy. Its trade turnover has already reached about 140,000 million roubles and is growing steadily every year.

The 25th Congress of the Communist Party of the Soviet Union stressed the importance of scrupulous fulfilment of the delivery plan in accordance with contracts concluded and targets for cooperated deliveries. It is envisaged in the Tenth Five-Year Plan that the switch of associations and enterprises engaged in mass and large-volume production to direct and long-term ties basing their relations on long-term economic contracts, will be completed. Practical solution of this task requires that important changes be made in the work of the State Committee for Material and Technical Supply and its agencies.

1. THE TASKS AND CONTENT OF THE PLAN FOR MATERIAL AND TECHNICAL SUPPLY

The Tasks of Planning Material and Technical Supplies

The plan for material and technical supplies coordinates the production and consumption of output for production and technological purposes on a macro-economic scale. In a socialist society, production cannot be planned without first assessing the explicit social demand for output, planning its allocation, and determining the quantities of material resources necessary for its manufacture. It is impossible to plan the production of chemicals, metal manufactures, cement or machinery, for example, if macro-economic demand for them and the quantities of raw and other industrial materials, fuel and equipment needed are not known. This means that the planning of production is closely linked with planning the allocation of output.

The necessary proportionality in planning the production and consumption of output in related sectors is maintained by using input-output methods. At the present stage, with the increased scale of social production, its greater specialisation and the correspondingly greater complexity of inter- and intra-sectoral economic linkages, optimal input-output coordination of production and output allocation is becoming particularly pressing. Lack of such coordination can either result in production not being provided with sufficient material resources, or lead to bottlenecks in disposing of goods already produced. The former leads to reduced efficiency in the work of enterprises due to a break in the rhythm of production, the substitution of materials other than those required by the production technology, machinery standing idle, additional inputs of labour and, in some cases, a reduction in the quality of the manufactured goods. These difficulties result in non-fulfilment of the basic volume indicator relating to the work of enterprises that have gone over to the new system of planning and economic incentives, i.e., the quantity of output sold.

The planning of material and technical supplies is aimed at solving the main politico-economic and socio-economic

problems which are anticipated in the planned period and which determine the rates and proportions of development in the various sectors of material production and in the non-productive sphere.

Material resources must in the first instance be allocated for developing the most progressive sectors, which ensure a rapid rate of scientific and technological progress. It is also essential to concentrate resources on construction projects that are nearing completion with a view to making them operational at an earlier date.

The plan for material and technical supplies is based on an accurate assessment of macro-economic demand for raw and industrial materials, fuel, electricity, equipment and other producer goods, with due regard for their rational use. The plan makes provision for supplying the national economy with progressive and extremely economic kinds of materials that correspond to the present-day level of production techniques and technology.

The invariable demand made with regard to any plan for material and technical supplies is that it should be feasible, that all its indicators should be fully coordinated, and that it should at the same time have the necessary tautness.

With a view to the steady development of social production, the supply plan allocates the necessary resources for the creation of stocks in production and distribution, as well as for the creation of state stockpiles and working stocks that are necessary to the economy and which will be used to satisfy unforeseen demand arising during the course of fulfilling the plan.

It is important in planning material and technical supplies to give enterprises greater economic independence in organising deliveries and supplies of raw and other industrial materials, fuel and equipment for production. This can be done by making further improvements in centralised planning, the proportional development of related sectors of material production, and by a better matching of materials and technology to the needs of production and capital construction.

The Content of the Supply Plan

The plan for the supply of materials and technical equipment consists of a set of physical input-output tables and plans for the allocation of output.

The physical input-output tables form the basis of the supply plan. Their purpose is to balance the sources of each type of output with macro-economic demand. To do this, each input-output table for the next planned period carefully determines all planned sources for the various types of output and their allocation according to their end-use or, in other words, their economic purpose.

On the basis of these tables, resources are specifically allocated to future recipients, i.e., USSR ministries, government departments, republican councils of ministers, etc. In this way, the allocation plans give practical expression to the allocative (uses) section of the input-output tables.

Inter-republican and inter-regional supply plans are drawn up for each type of output that is allocated by the USSR State Planning Committee and the USSR State Committee for Material and Technical Supply (for oil products, coal, certain types of chemicals, building materials, etc.), by the all-Union central state committees for supply and sales. This part of the material and technical supply plan specifies the volume of output to be supplied by all-Union and republican ministries and departments, economic associations or enterprises coming under a particular ministry, which are situated in a particular republic, to consumers in other Union republics and economic areas, as well as to all-Union consumers, and for export.

The plans for inter-republican supplies determine the economic ties between Union republics and economic areas. The input-output tables and the output allocation plans serve as the basis for compiling the plans for inter-republican supplies.

In the course of preparing the material and technical supply plan, its indicators are coordinated with other sections of the macro-economic plan—the development of

industry, agriculture, capital construction, transport, domestic trade, exports and imports, finance, etc.

The link between the supply plan and the plans for the development of industrial and agricultural production and capital construction is twofold. On the one hand, these plans specify the volume of output that is taken into account in the input-output tables in the form of allocable resources. On the other hand, they also contain the indicators relating to the quantity and demand structure of raw and other industrial materials, fuel, electricity and equipment that are necessary to ensure the production of planned output and the commissioning of new capacities, the demand for which is taken into consideration in the input-output tables and plans for the allocation of the appropriate material resources.

The plan for the supply of materials and technical equipment is closely linked with the main trends in the design and economic application of the most progressive types of plant and machinery and the most economic materials, as well as the application of new technological processes, mechanisation and automation of production. In allocating material resources, the supply plan takes account of the lower level of materials intensity of output and the economies in material resources that can be achieved by implementing measures in the section relating to the introduction of new technology.

The supply plan affects the volume of traffic that is established, i.e., it affects the development of transport. On the other hand, it also takes into account demand by the transport system for material resources. The supply plan also reflects the tasks of developing foreign and domestic trade, and the provision of general social amenities, and cultural and health facilities.

The indicators for the material and technical supply plan are related to the finance plan, the volume of credit and the use of circulating assets by enterprises. This is because proper financial provision must be made for the total volume of allocable material resources provided for in the supply plan, including the creation of stocks.

2. THE DIFFERENT TYPES OF INPUT-OUTPUT TABLES AND THE METHODOLOGY OF COMPILING THEM

Besides forming the basis of the supply plan, physical input-output tables are also included in the whole system of such tables in the macro-economic plan. In compiling them, it is important not only to balance resources with the allocation of output for each type separately, but also to co-ordinate the whole set of tables, above all, for related types of output. This is of prime importance for balancing the volumes of production of the different types of output in each planned period and for maintaining a steady supply of essential producer goods to the economy.

Types of Input-Output Tables

In practice, various types of input-output tables are used in planning material and technical supply. They vary according to the economic purpose of the planned output, the length of the planned period for which the tables are drawn up, and the scale of operations.

Depending upon the economic purpose of the output, input-output tables are divided into tables for objects of labour (raw materials, fuel, electricity and other industrial materials); tables for implements of labour (machinery, equipment, cables and instruments); and tables for individual consumer goods (foodstuffs, clothing, goods used for cultural and social purposes, and household articles).

The plan for material and technical supply usually includes the first two groups of tables covering producer goods or, in other words, output to be used for production purposes.

Long-term and current input-output tables differ according to the length of the planned period.

Long-term tables are, in their turn, divided into tables compiled for a long-range period ahead (15-20 years), and tables compiled for each five-year plan. They take the form of balance sheets for a narrow range of the most important types of output in the economy. Thus, when the five-year

economic development plan for 1971-1975 was being prepared, the USSR State Planning Committee compiled input-output tables for approximately 300 items from the most important types of output. Five-year input-output tables are broken down by years, while the tables covering longer periods are also divided into intermediate periods.

Current input-output tables are drawn up for a wider range of industrial and agricultural products, usually for a year, and, when necessary, are broken down into half-yearly or quarterly periods within the planned year. Thus, for 1973 the USSR State Planning Committee compiled about 1,900 input-output tables, and the bodies attached to the USSR State Committee for Material and Technical Supply, more than 13,000.

All-Union, republican, sectoral and regional tables differ in the scale of their operations. Each type of input-output table has its own methodology and set of indicators.

Indicators and Compilation Techniques

An input-output table consists of a "sources" section and a "uses" section. The basic indicators under sources are the planned volume of output, imports, other receipts, and stocks held at the beginning of the year by suppliers, consumers, and at supply and sales depots. As mentioned above, the tables allocate these resources according to their economic purpose, i.e., for production operations, including the main end-uses, for capital construction, special expenditures, exports, wholesale and retail stocks, the replenishment of state stockpiles, working (unallocated) stocks, and the creation of stocks at the end of the year according to where they are held—by consumers, suppliers, or supply and sales depots (see Table 7).

The volume of production of industrial output in the sources section of the tables is determined on the basis of calculations which foresee the fullest utilisation of existing productive capacities, as well as the planned commissioning and bringing on stream of new capacities both as a result of reconstruction and building new facilities. These calculations are based on the table for productive capacities

Table 7

Standard Form of an Input-Output Table

(item of output) for 197_____	(unit of measurement)		Year under review (base year)	Planned period (years)
I. Sources—total including: 1. Production of which, by ministry or supplying department 2. Imports 3. Other receipts 4. Stocks at the beginning of the year—total including those held by: suppliers consumers regional supply and sales depots . . . II. Allocation—total Including: 1. Production operations—total of which, by main end-use and sector 2. Capital construction 3. Special expenditures 4. Wholesale and retail stocks 5. Exports including those through general sup- pliers 6. State stockpiles 7. Unallocated stocks 8. Stocks at the end of the year including those held by: suppliers consumers regional supply and sales depots . . .				

in the next planned period. This table takes account of the projected volume of investment in the development of sectors and the dates fixed for the commissioning and bringing on stream of new enterprises. The tables relating to agricultural raw materials are compiled on the basis of the projected volume of state purchases of agricultural output.

The volume of imports is determined in accordance with projections for the foreign trade plan. Supplies of imported goods are estimated with reference to specialisation in particular sectors of production by socialist countries, as well as imports through foreign trade channels with capitalist countries. Expected stocks of different types of output held at the beginning of the planned period are calculated from current statistical data, and are liable to subsequent revision. For some types of output, the tables also take into account secondary sources and other receipts.

When compiling input-output tables, it is extremely important to make a careful and accurate appraisal of the macro-economic demand for the respective types of output. Demand for material resources for production needs is usually calculated by the direct calculation method on the basis of established rates of consumption and the planned volume of output, in the production of which the resources will be used. When determining demand for material resources, the repair and operation needs of enterprises must also be taken into consideration. The maintenance of basic production assets in proper working condition is indispensable if the quality of output is to be improved, and the number of rejects and costs of production reduced.

Demand for material resources for capital construction is calculated on the basis of the projected volume of capital investments in the different sectors of the economy and on the basis of aggregated standard levels of consumption of materials per million roubles' worth of building and installation work.

In the input-output tables, demand for production purposes and for construction is broken down according to the main areas of consumption. Thus, the table relating to rolled steel shows how it is allocated to meet the needs of mechanical engineering and metalworking, with separate divisions for the main, most metal-intensive sectors (heavy engineer-

ing, and the motor, tractor and electrical machinery industries, etc.). It shows the allocation for the production of consumer goods, and for capital construction, with allocations according to the sources of finance (state and non-centralised construction, building of social amenities on collective farms financed from non-distributable funds and cooperative housing construction, etc.).

The division of the uses section into the most important end-uses of material resources ensures that the tables for the different types of industrial and agricultural output are consistent and, at the same time, makes possible the coordinated development of the various macro-economic sectors.

Demand for plant is determined on the basis of planning documentation for construction projects or, in particular cases, on the basis of aggregated norms (for example, rolling-mill plant per million tons of capacity in the production of rolled steel; chemical plant as a percentage of the volume of investment, etc.).

The volume of wholesale and retail stocks in the tables is fixed in accordance with the projected increase in the standard of living of the population on the basis of projections for the retail trade plan, as well as the ratio between money income and expenditure of the population. Under volume of exports, material resources that are dispatched through general suppliers for construction in other countries are marked as a separate entry. The scale on which material resources are allocated to state stockpiles and working stocks is determined with due regard for the importance of particular materials in developing the economy, their degree of scarcity, the availability of capacities for the production of these materials, the location of productive capacities throughout the country, and a whole series of other factors.

Stocks of goods held at the end of the planned year by consumers and suppliers and at supply and sales depots are calculated according to norms based on the need to maintain an uninterrupted supply of materials and technical equipment to production and construction, to keep total supplies to a minimum and to accelerate their turnover. In this connection, the tables must make provision for the optimal location of stocks in the economy as a whole, and their greatest possible concentration in the sphere of circulation.

The sources of output and their allocation in the planned period must be compared with the figures relating to the period under review (base period). This makes it possible to evaluate structural shifts in productive and non-productive consumption of material resources and consciously effect the necessary re-allocation of material resources among the economic sectors, concentrating them with a view to solving the priority tasks singled out for the planned year.

Input-output tables are usually compiled in physical terms. For particular types of output, the tables are compiled in units of value. Tables for plant are compiled in physical and value terms in order to coordinate the planned volume of plant with investments.

Input-output tables have their own characteristics according to the particular type of output they are dealing with. For example, the table relating to fuel is drawn up in the form of an aggregated table covering all types of fuel in terms of coal equivalent, taking account of the calorific content of particular types of fuel and the complex, interrelated rates of consumption of electricity, thermal power and boiler and furnace fuel in the production of the various types of output. On the basis of this table, tables and plans are drawn up for the allocation of specific types of natural fuel, including by field. Coking coal, furnace fuel oil, firewood, peat and other types of fuel are dealt with separately, and account is taken of enterprise fuel systems established on the basis of techno-economic calculations, rational zones for the transport of coal from the various coalfields, transport of other types of fuel and many other factors. The table relating to electric power is compiled for the country as a whole and for each republic, showing the amount of electricity generated in particular power grids.

The tables relating to the output of the mechanical engineering industry define several important end-uses: for re-equipping the mechanical engineering industry; for agriculture, including land improvement and water supply; for the application of measures for the mechanisation and automation of production processes, and the introduction of new technology.

The compilation of planning input-output tables is an active process of comparison and selection in order to pro-

vide an optimal supply of producer goods for developing all sectors of a socialist economy.

The total macro-economic demand for a particular type of output is determined in the initial stage of compiling the input-output tables, and shortages or surpluses are discovered by comparing resources. Next, the USSR State Planning Committee, in conjunction with USSR ministries and government departments and the state planning committees of the Union republics, carries out the complex operation of coordinating the sources of the different types of output and their consumption. This is done on the basis of the growth rates, scale and proportions of the whole of social production, and the task of constantly raising people's living standards, all of which were determined in the preparatory planning stage. Coordination is achieved by the partial redistribution of investment among the sectors and industries, by adjustments in projected commissioning dates of productive capacities and in the volumes of production, and by changes in other components of the tables. As a result, in the final stage, fully consistent tables for the most important types of output are drawn up, in which available resources are brought into line with macro-economic demand. The various offices attached to the USSR State Committee for Material and Technical Supply undertake the same kind of work for the range of products for which the input-output tables and allocation plans are approved by the Committee, while the appropriate ministries and departments take responsibility for their production plans.

The Relationship Between Input-Output Tables

As already mentioned, when compiling input-output tables, it is important not only to coordinate sources and allocation within each table, but also to coordinate the whole set of tables for related types of output. Inter- and intra-sectoral proportions in industry are determined on the basis of interrelated tables. Thus, the volume of output produced by the iron and steel and non-ferrous metal industries depends to a significant degree on the volume of production of fuel, electricity, various chemicals, etc. The volume of iron and steel and non-ferrous metal production, in its

turn, affects the growth of output in the mechanical engineering and metalworking industries. The development of the energy industries is closely linked with that of electrical engineering, which in turn consumes a significant proportion of the output of the non-ferrous metal industry, as well as plastics. Electricity generation, in its turn, determines demand for various types of fuel.

Tables relating to many types of output are also used to establish the necessary proportions between the various economic sectors, thereby drawing together all the many aspects of extended social reproduction into a single unified whole. The production links between industry and agriculture show up in the tables for agricultural raw materials and the tables for industrial output designated for use in agriculture (mineral fertilisers, tractors and other agricultural machinery, fuel, etc.).

Rapid growth in the chemical industry goes hand in hand with major shifts in the entire structure of material production. Changes take place, not only in the proportions existing between the growth of different sectors of the chemical industry itself, but also between the other economic sectors. This calls for the prompt re-allocation of material resources among the economic sectors, Union republics and economic areas of the country. Thus, the growth in the production of mineral fertilisers for the purpose of intensifying agricultural production necessitates not only the expansion of the raw material base, but also increased production of sulphuric acid and chemical plant, an expansion in the construction of buildings in which to store the fertiliser, the allocation of transport facilities for the delivery of fertilisers, etc.

It is essential that coordination should be achieved between the input-output tables and the output allocation plans prepared by the different planning and economic bodies, particularly the USSR State Planning Committee and the USSR State Committee for Material and Technical Supply. Poor coordination between the input-output tables relating to such types of output frequently results in uncoordinated plans for material and technical supply of interrelated types of manufactures and semi-finished goods and materials that go into the production of one and the same product but which are allocated by different bodies.

3. THE SYSTEM FOR THE ALLOCATION OF PRODUCER GOODS

Plans for the allocation of output throughout the economy are prepared on the basis of interconnected input-output tables. The main task of these plans is to coordinate allocated resources with the plans for production and capital construction for each USSR ministry and government department, and Union republic. The allocation plans are, therefore, compiled with a break-down according to future recipients. In allocating output by producers, resources are earmarked for special purposes, such as the various sectors of capital construction, the re-equipment of mechanical engineering, research, etc.

In preparing allocation plans, the demand of ministries and the Union republics is determined by the same methods as are used in compiling input-output tables. However, the projected quantities of allocated stocks must be revised in accordance with the ratio between standard requirements of production stocks and stocks of goods, and expected stocks held in the different sectors. If expected stocks at the beginning of the year exceed those required, then calculated stocks held by the respective consumers should be reduced. If expected stocks turn out to be less than required, then steps are taken to replenish them.

Expected stocks remaining in the hands of consumers are evaluated on the basis of current statistical information regarding such stocks, fulfilment of the production plan and consumption of the given output, and supply plans for the rest of the planned period. Figures for actual stocks held by consumers at the beginning of the year are established from records of the USSR Central Statistical Board. If these figures diverge from the indicators relating to stocks laid down in the plan, consumers' stocks are revised.

At the present time, input-output tables and plans for the allocation of the most important types of output are approved as part of the economic plan by the Council of Ministers on the submission of the USSR State Planning Committee and the USSR State Committee for Material and Technical Supply. The task consists in concentrating the greater part of the planned allocation of output in the hands

of the USSR State Committee for Material and Technical Supply and its central and local offices. The range of products dealt with by the USSR State Planning Committee must include only the most important types of raw and other industrial materials, fuel and plant, while that dealt with by ministries and government departments must include output which is produced and wholly consumed in any one sector.

Equally important is the steady decentralisation of the allocation of particular types of output by regional supply bodies. Such a form of allocation enables local enterprises to decide questions regarding the planning of material and technical supply more successfully without requesting instruction from their sponsoring departments or central supply organisations. With the potential of this form of allocation in mind, the USSR State Committee for Material and Technical Supply transferred to the regional material and technical supply bodies the responsibility of allocating to consumers a large number of items of materials, equipment, instruments, plant and machinery.

Experience has shown that regional supply bodies assess the demand of enterprises more accurately and allocate output to consumers with greater operational efficiency and flexibility. At the same time, this in no way weakens centralised planning, since the basic types of output, which determine the essential proportions of the economy, are allocated by the central planning and economic bodies.

Producer goods are allocated as follows: In their capacity as consumers, enterprises and organisations determine their demand for the range of output that is covered in the macro-economic plan and dealt with by the USSR State Planning Committee, and submit their estimates, together with their projections for the production and capital construction plan, to their sponsoring ministries and departments. The ministries and departments summarise them by sector and present them in this form to the USSR State Planning Committee. Republican and local consuming units in the Union republics do the same. The USSR State Planning Committee coordinates the sources and uses of output, and compiles input-output tables and allocation plans. After these have been approved (in the case of products covered

by the macro-economic plan, by the USSR Council of Ministers, and in the case of other products, by the USSR State Planning Committee), the relevant sections of the allocation plans, together with the approved plans for production and construction, are sent to the respective ministries, government departments and Councils of Ministers of the Union republics, i.e., to the future recipients, who are then responsible for the allocation of output to enterprises and organisations at subdepartmental level.

In the case of products allocated by the USSR State Committee for Material and Technical Supply (except those goods, responsibility for which has been transferred to the regional supply bodies), the allocation procedure is similar to that described above, but with the following difference: the plans for the allocation of such output are approved by the USSR State Committee for Material and Technical Supply or its central supply and sales bodies, while production plans are approved by the production ministries and departments in agreement with the State Committee. The regional material and technical supply bodies receive estimates of demand for the respective types of output from enterprises, summarise them by region and sector and submit them to the all-Union central supply and sales organisations attached to the USSR State Committee for Material and Technical Supply. By matching sources and uses at the macro-economic level, these organisations allocate resources to each central and regional administrative department, and the latter allocate them to specific consumers.

4. THE STANDARD RATES AND NORMS USED IN MATERIAL AND TECHNICAL SUPPLY

A properly validated system of standard rates and norms is of great importance in the preparation of input-output tables and allocation plans for the economy as a whole. Various types of standard rates and norms are used in input-output calculations. The main ones are the standard rates of consumption of material resources, and the norms relating to the use of equipment, as well as standards regarding the level of production stocks and stocks of goods.

Standard rates of materials consumption regulate the quantity of productive inputs of raw and other industrial materials, fuel, and other elements going to make up the objects of labour. Together with the norms for the use of tools and instruments of labour, they determine the indicators relating to the use of embodied labour in the process of production.

The establishment of a planned amount of inputs of social labour per unit of output produced or work performed is the basis of material and technical supply planning. On the basis of standard rates of materials consumption and use of plant, demand for producer goods is determined, material resources are allocated, and the proportions between the sectors of material production are established.

Standard rates of materials consumption must be progressive and technologically sound and reflect the present-day level of techniques and the advanced technology and organisation of production. In working them out, account must be taken of the most rational use and all-round economy of material resources. If the efficiency of social production is to be increased, it is of vital importance that standard consumption rates be reduced as a result of scientific and technological progress. The *Guidelines for the Development of the National Economy of the USSR for 1976-1980* adopted by the 25th CPSU Congress defined the main ways for economising material resources. They are, in the first place, reduction in every way of the consumption of materials per unit of output by a wider application of advanced designing and improvement of production techniques. Output of economical goods will be increased, per-unit-output consumption of raw materials and supplies reduced, and fuller and more comprehensive processing of materials ensured. The use of secondary resources will be extended.

Concrete assignments for economising current material resources have been established for the various sectors of the economy in 1976-80. Thus consumption of rolled steel in mechanical engineering and metalworking must be reduced by 14 to 16 per cent. It is expected to make a saving of around 5 to 7 per cent on rolled steel, of 5 or 6 per cent on cement, and of 12 to 14 per cent on timber in building. Consumption of boiler and furnace fuel is to be

reduced by 3 or 4 per cent, of electric and thermal power, by 5 per cent, and of petrol and diesel oil in road freight haulage, by 8 per cent.

Standard rates for the consumption of raw and other industrial materials, fuel and electricity, and norms relating to the use of plant, machinery and mechanical equipment, are worked out by enterprises in conjunction with factory laboratories, research institutes, planning and design offices and technological organisations. The setting of standard consumption rates is organised by ministries, while coordination and methodological guidance is the responsibility of the USSR State Planning Committee. The standard rates are confirmed by enterprise managements, while the most important individual and aggregated sectoral standard rates are approved by the USSR State Planning Committee on the submission of ministries and Union republics. The enterprises and ministries review the standard rates in the light of the tasks laid down by the USSR State Planning Committee relating to the average reduction for the planned year.

When compiling the macro-economic plan, besides individual standard rates for the most important types of output, aggregated groups of standard rates are used, which represent the level of material inputs in the production of homogeneous output by ministries or the economy as a whole.

Standard consumption rates in construction are calculated per million roubles' of building and installation work, and according to financial or production standard rates per physical unit of volume of work.

Various methods—analytical, experimental, and statistical—are used to work out the standard consumption rates. When standard consumption rates are calculated on the basis of statistical data for the preceding period, no account is taken of measures for the improvement of techniques, technology and the organisation of production, which could result in a decreased consumption of materials. They cannot as a rule, therefore, be progressive. The experimental method should be used in cases when other methods are complicated and unreliable. The analytical method of calculation is based on a combination of rigorous technical estimates and an analysis of the production conditions under which

the materials are consumed. Use is made of indicators set by leading workers, progressive technological processes at comparable enterprises, and information provided by analysis of the reasons for any deviation in actual consumption from the planned rate of consumption, an analysis of the effectiveness of measures for economising on materials, etc. The analytical method of calculation is therefore the most progressive method for establishing standard consumption of materials.

Under present conditions, the systematic rationalisation of different individual standard rates and norms is becoming increasingly pressing, as is the aggregation of individual standard rates by industry, economic region and Union republic for the purpose of using them in the preparation of current and long-range input-output tables and output allocation plans.

The USSR State Planning Committee is striving to simplify the work of devising and setting standard rates in all economic sectors, to improve the methodology of establishing standard rates, and to create an automated system for collating the relevant data for use in macro-economic planning. With the greater economic independence of enterprises, the main emphasis is not on the presentation of standard rates for approval by higher-level organisations, as used to be the case, but simply on putting forward, on a sectoral level, tasks relating to an average reduction in the standard consumption of raw materials, fuel and other most important types of materials. At the same time, a rational system of standard rates of materials consumption for repair and operational requirements and for capital construction is being created.

A great deal of work is also being done on the creation of an automated system for accumulating data relating to standard rates, which will be a major prerequisite for improving the methods of studying the demand by production and construction for material resources.

Standards regarding the level of production stocks and stocks of goods are another important element in the body of information relating to standards and norms which form the basis of the plan for material and technical supply on a macro-economic level. A necessary minimum level of

stocks of raw and other industrial materials and completing articles is an indispensable condition of the smooth and continuous working of enterprises. The job of establishing standard levels for stocks must be based on a rational organisation of material and technical supplies and regular deliveries during the planned period. Account must also be taken of any expansion in the wholesale trade of producer goods and direct long-term production ties between consumers and suppliers. It is very important to establish rational standard levels for stocks in the hands of consumers, suppliers, and supply and sales depots through an optimum combination of supplies direct to the consumer and from warehouses. An important requirement in this respect is that the stocks should be complete and have a quick turnover on a macro-economic scale. With the present-day scale of social production, an increase in the turnover of industrial stocks by only one day is equivalent to an addition to the economic turnover of material values of more than 1,000 million roubles.

When the plan for material and technical supplies is being prepared, standard levels are established for both types of stocks carried over at the end of the planned year. They are calculated when the annual demand for materials is being determined, and are earmarked for maintaining the uninterrupted operation of the economic sectors. These standard levels are worked out for different product groups which are established for the purpose of allocating them. In addition, enterprises must work out operational standard levels for stocks for each different type of output for the purpose of regulating supplies.

Current, contingency and preparatory stocks of materials vary according to their purpose and the manner in which they are created. Current stocks provide for the accumulation of materials for continuous production in the period between regular deliveries. Contingency stocks are necessary to maintain uninterrupted production and supply in the event of an irregularity in the average intervals between deliveries. Preparatory stocks are needed for the period of time necessary to prepare the materials for release into production. All these elements are taken into account when standard levels for stocks are being established.

5. THE PLANNING AND ORGANISATION OF RATIONAL ECONOMIC TIES IN THE DELIVERY OF OUTPUT

The Specification of Material Resources and the Placement of Orders

Materials for distribution under the allocation plans are shown in aggregated product groups. However, industrial consumers must have a particular range of raw and other industrial materials, semi-finished goods and manufactures for the production of output within the time limits required by the conditions of production and construction, while producers must have a detailed production programme for a particular range of goods. The state plan for material and technical supply, therefore, is specified in greater detail, and the work entailed in implementing it is organised in the course of specifying the materials allocated to consumers, placing orders with the enterprises, linking suppliers with consumers and concluding contracts. This is essentially a process of coordinating in time production and construction plans for all the different enterprises and construction projects in the country with plans for supplying them with materials and equipment over a wide range and assortment of necessary producer goods. To do this on a country-wide scale is an extremely complicated task.

Materials specification consists in determining the detailed technological conditions and parameters of producer goods allocated and delivered to individual consumers. For this purpose, enterprises and consumer organisations calculate their specific demand for materials on the basis of their production or construction programme and submit their specifications to the regional material and technical supply bodies. The latter summarise them for their own particular region, decide on the most rational forms of supply (direct or from warehouses), and submit the summary specifications to the all-Union central supply and sales organisations attached to the USSR State Committee for Material and Technical Supply.

On the basis of this declared specific demand for output and the coordination of the product-range production plans

with the production ministries and government departments, the all-Union central supply and sales organisations link consumers with suppliers and allocate orders for the manufacture and delivery of output. In the case of output that is not allocated centrally (cement, some building materials, chemicals, etc.), the all-Union central supply and sales organisations define the regions of consumption for suppliers, which enables the regional supply bodies to establish contact with particular consumers and issue orders for the delivery of output to enterprises.

The specification of materials, the allocation of orders and the linking of suppliers with consumers are important stages in the process of putting the centralised plans for the allocation of producer goods among the Union republics and economic sectors into effect at enterprise and construction project level. It is in the course of these operations that rational economic links are formed for the delivery of output for production and economic purposes.

Economic contracts concluded between enterprises and production associations, and supply and sales bodies are of the greatest importance in forming economic links and organising deliveries of output and its regular supply to the consumer. The contracts set out the conditions for the delivery of output in the best interests of both parties, and lay down the material responsibility for failing to carry out mutual obligations. They therefore play a vital role in increasing discipline with regard to deliveries.

Equipping Enterprises Being Built or Modernised

In the Soviet Union, which is carrying out a vast programme of capital construction, planned supply of equipment for projects under construction or modernisation is of prime importance. The macro-economic plan for the supply of materials and technical equipment includes a summary input-output table for plant and machinery, whose purpose is to coordinate the planned volume of investment with the production programme for engineering output, expressed in value terms. On the basis of an analysis of the volume and structure of investment, it enables a comparison to be made

of information on the demand by economic sectors for plant and machinery with the available sources for satisfying that demand in each planned period. On the basis of the macro-economic plan, the necessary correspondence is established between rates of output growth in the engineering sectors and investments in the development of the different sectors.

The most important construction projects are equipped with plant and machinery, fittings, instruments, automated and communications systems, cables and other manufactured goods by the all-Union central equipment organisations under the USSR State Committee for Material and Technical Supply, and by the regional equipment organisations within the central and regional material and technical supply departments. With respect to the construction projects for which they are providing equipment, the all-Union central equipment organisations act as holders of the plant and machinery being allocated. In the allocation plans, prepared by the USSR State Planning Committee and the all-Union central supply and sales organisations, attached to the USSR State Planning Committee for Material and Technical Supply, the plant and machinery for equipping construction projects are marked as a separate entry. In the case of output that is allocated to consumers by the regional supply bodies, resources for the equipment of construction projects are allocated to regional equipment organisations.

The significance of the centralised system for the equipment of construction projects with plant and machinery is growing yearly, and the operations of the organisations providing equipment under the USSR State Committee for Material and Technical Supply are being extended accordingly. These organisations are already equipping more than 4,500 construction projects with plant and machinery, representing more than 15,000 million roubles' capital investment.

Direct Long-Term Links

The 25th Congress stressed the need for further development and improvement of the national system of material and technical supplies, through further transfer of enterprises

and associations to direct, long-term economic ties and by the development of wholesale trade through the intermediary of the supply bases, warehouses, and shops of territorial supply-and-marketing organisations.

The distinguishing feature of direct long-term ties is the direct and stable nature of the economic relations between enterprises in the exchange of producer goods. On the basis of stable links between suppliers and consumers, and the total volume of deliveries under the plan, responsibility can be passed to enterprises for decision-making on a significant proportion of specific questions relating to the sale and distribution of output to production—agreement on the range and quality of output supplied, delivery dates and the make-up of deliveries.

The development of this form of economic ties makes for more flexible conditions for supply and sale, enables suppliers to draw up a production programme on the basis of firm orders from customers, and ensures the necessary regularity of deliveries. This makes it possible to increase the productivity of labour, improve the use of production assets, lower the level of materials intensity and improve the quality of output from the customers' point of view, and to bring new, progressive types of manufactured goods into production more quickly.

The bodies of the USSR State Committee for Material and Technical Supply, in conjunction with the ministries, have effected the transfer of more than 16,500 consumer enterprises and 3,500 suppliers to this system of economic ties, covering deliveries of 1,050 product-group items. At the present time, more than 24 per cent of rolled steel, approximately 30 per cent of sodium carbonate, 60 per cent of paper, 90 per cent of wood pulp, 73 per cent of synthetic rubber, etc., are being delivered according to the plans for long-term links.

Direct long-term economic ties are established by the all-Union central supply and sales organisations under the USSR State Committee for Material and Technical Supply on the basis of proposals from enterprises, regional supply bodies, ministries and government departments. They can be organised rationally only on a country-wide scale and must correspond to the most effective regional and sectoral social

division of labour with due regard to keeping production and transport costs to a minimum. In this connection, the all-round technological and economic basis of the established ties is of great importance. The development of direct and stable ties requires the strengthening of contractual relations between enterprises and the conclusion of direct economic contracts covering an extended period. This in turn increases the importance of long-range planning.

The development of direct long-term economic ties must be examined in the context of the other task, set by the Soviet Communist Party, of expanding and improving wholesale trade in producer goods. In a socialist society, wholesale trade is designed to ensure the sale of output to specific consumers on the basis of the plan and the extensive use of commodity-money relations. It is carried out by the sale of output, which is supplied direct or through stores, warehouses and shops, or through the secondhand trade in materials and equipment surplus to the requirements of particular enterprises.

Wholesale trade in producer goods enables the consumers themselves to purchase, at a particular time and in the necessary quantity and range, materials and manufactured goods to fulfil their production plans. It makes it possible to increase the efficiency of profit and loss relations between consumers, suppliers and material and technical supply bodies in selling and distributing engineering goods output and its circulating in the economy. Wholesale trade is carried out on the basis of orders from consumers by the unlimited issue of materials and manufactured goods by depots and shops (when there are sufficient resources), or on a quota system.

The development of wholesale trade, as also of direct long-term economic ties between enterprises, calls for raising the quality of planning and the strict input-output coordination of sources of output with macro-economic demand, and for improving the system of output allocation to sectors, Union republics and different areas of the country. Lack of planning coordination reduces the reliability of supply, destroys the stability of economic ties, and hinders the creation of the necessary range of output for wholesale trade.

Taking into account the constant growth in sources of

output, the USSR State Committee for Material and Technical Supply is carrying out a gradual transfer of consumers to the wholesale trade system. First to be transferred were research, project-planning and technological organisations, and other consumers who receive output in small quantities. The number of this type of consumer is constantly expanding, as is the range of output that is sold wholesale. The unlimited supply of oil products, building materials and chemicals is organised in a number of areas of the country.

6. THE USE OF ECONOMIC-MATHEMATICAL METHODS AND COMPUTER TECHNIQUES IN PLANNING MATERIAL AND TECHNICAL SUPPLY

The planning and management of material and technical supply on a macro-economic scale covers a large number of complex planning and operational economic problems, most of which require multi-variant calculations, and a search for optimal solutions, i.e., those solutions that are best in the given, concrete circumstances. Under present-day conditions, the solution of these problems involves a vast amount of data, the content of which is varied and which it is becoming impossible to process manually or by using simple machines. The increased scientific level of the planning and management of material and technical supply, therefore, makes the widespread use of mathematical formalism and modern electronic computing techniques extremely pressing.

The Range of Problems for Solution

The main areas in which economic-mathematical methods and electronic computer techniques are used in planning material and technical supply are:

- the determination of macro-economic demand and demand by different sections for producer goods;
- the compilation of inter- and intra-sectoral input-output product tables, expressed in physical terms;
- the rational allocation of output, taking into account established economic priorities;

the planning of the optimal allocation of orders to industry and the loading of productive capacities by type of output;

the solution of problems relating to the optimisation of economic ties on the basis of optimal plans for linking suppliers with consumers for the supply of output for production and technological purposes;

the optimisation of the ratio between supply direct to the consumer and from warehouses and the level of stocks, and the planning on this basis of the optimal location of supply and sales depots, etc.

To obtain a coordinated solution to many of these problems a set of economic-mathematical models and algorithms have been prepared and supplied with the appropriate programmes, technology and information. Both determined and stochastic models are used, most of which are solved by linear-programming techniques, while in some cases dynamic programming is used.

By determining macro-economic demand for producer goods and by establishing basic standard rates and norms with the help of economic-mathematical methods and computer techniques, it is possible gradually to do away with the business of presenting claims, or provisional requests, to consumers, particularly in the first stages of planning, to change the character of the work involved in the supply plan, and to improve the basis for the allocation of producer goods.

Thus, using economic-mathematical and computer techniques, a number of ministries formulate basic standard rates and norms as well as carry out summary calculations of sectoral demand for materials. Since 1971, the USSR State Planning Committee, in conjunction with the Chief Computer Centre, has been calculating demand from production for 90 groups of the most important materials on the basis of standard data formulated by the automated system of standard rates and norms. Calculations are made of average weighted rates and demand for materials for capital construction from all sources of finance, taking into account the sectoral structure of building and installation operations that has been agreed with ministries, government departments and Union republics, and other important factors influencing demand. The USSR State Committee for Mate-

rial and Technical Supply, in conjunction with its Chief Computer Centre and computer centres in republican and regional supply bodies, is solving more than 40 problems relating to the determination of demand for different types of output for production and technological purposes, using specially adapted information carriers.

Most of these problems belong to the class of information problems with clearly determined relationships. They are generally solved by the direct calculation method on the basis of projections for the production plans and materials consumption rates. In their general form, these calculations can be represented in the following way:

$$y_i^{(t)} = \sum_j a_{ij}^{(t)} \cdot x_j^{(t)}$$

where $y_i^{(t)}$ —demand for the i th material in the t th period;

$a_{ij}^{(t)}$ —consumption rates of the i th material in the production of the j th products (operations) in the t th period;

$x_j^{(t)}$ —planned volume of production of the j th products (operations) in the t th period.

Besides the direct calculation method, mathematical-statistical techniques are beginning to be applied in forecasting demand for particular types of mass consumption goods, especially when there is a lack of a reliable basic standard.

In input-output calculations, economic-mathematical methods and computer techniques are applied to solve various problems. Every year since 1968, the USSR State Planning Committee and its Chief Computer Centre have compiled tables in physical and value terms, including 5,500 types of engineering output, for the purpose of coordinating production with the planned volume of investment in production. Calculations are being carried out and improvements made in the methodology of compiling inter-sectoral input-output tables of the production and allocation of output in physical terms, designed to synthesise and coordinate the whole system of input-output tables. The Chief Computer Centre of the USSR State Committee for Material and Technical Supply is carrying out calculations for the all-Union Chemical Supply Board of an inter-product input-

output table for chemical output for the purpose of coordinating the production of different chemicals with consumption both within the sector and with final consumption in other sectors. Statistical models without optimisation elements are generally used for all these problems.

The compilation of complex input-output tables for substitute types of output, with the aim of finding optimal solutions, is becoming increasingly important. The fuel and power input-output tables is a prize example of such a table. Calculations in the Chief Computer Centre of the USSR State Planning Committee for a table of this kind for the years 1975-1980 made it possible to determine levels of development in the production of particular fuels in different areas of the country with due regard for the optimisation of their production and consumption on a macro-economic scale, as well as the minimisation of transport costs.

Complex input-output tables should also be compiled on a wide scale for many other types of substitute goods. The problem of optimising these tables takes the following form:

$$F := \sum_{ijk r} x_{ijk r} C_{ijk r} \rightarrow \min,$$

where $x_{ijk r}$ —unknown values of deliveries of substitute types of output which ensure the planned volume of production with minimal total reduced costs;

$C_{ijk r}$ —unit reduced costs for the production, transport and use of the i th product by the j th consumer in the k th region using the r th mode of transport ($i = 1, 2, \dots, m$; $j = 1, 2, \dots, n$; $k = 1, 2, \dots, l$; $r = 1, 2, \dots, t$)

The problem has the following constraints: the volume of deliveries of each i th product to all consumers must not exceed the proposed volume of it produced in the planned period; the total volume of deliveries of all products to the j th group of consumers in the k th region must ensure the planned volume of production by these consumers; the total volume of deliveries must not exceed the traffic-handling capacity of the particular mode of transport.

The optimal calculation of complex input-output tables by using linear and dynamic programming techniques provides a better basis for compiling partial input-output tables for each of the products included in the complex, for establishing the optimal volume of production and for using each of the substitute products with due regard for discovering bottlenecks in the inter-regional production flows.

A promising trend seems to be the use of computers in planning the allocation of output both to stock-holders and to specific consumers within one or another sector or region. More than 20 different problems of this type are already being solved by the USSR State Committee for Material and Technical Supply. The most interesting of these are problems of allocating output with reference to fixed priorities in use. The application of economic-mathematical techniques is particularly effective in planning the ties between consumers and suppliers, the allocation of orders and the loading of productive capacities by type of output.

Using computers, the USSR State Committee for Material and Technical Supply solves approximately 350 such problems. In 1972, calculations regarding optimal links between consumers and suppliers included the delivery of various types of products for production and technological purposes, accounting for a total volume of more than 600 million tons. The solution of this problem provided an annual saving on transport costs of more than 59 million roubles. The calculations were carried out for iron and steel and non-ferrous metals, cement and other building materials, coal and oil, particular chemicals, etc. Taking into account that on a macro-economic scale approximately 1,500 million tons of goods for production and technological purposes are transported every year, a complete range of calculations regarding optimal links will, within the next few years, provide economies on transport amounting to 90-100 million roubles, and release 25,000-30,000 freight cars.

As a rule, either closed or open models for a linear-programming transport problem are used to establish optimal links between consumers and suppliers for particular types of output.

Problems relating to the optimal allocation of orders and the loading of productive capacities by type of output can be successfully solved for various types of rolled steel and steel pipes, copper, aluminium and other non-ferrous metals. The economic-mathematical model for such problems may be expressed in its general form as follows:

$$Z = \sum_j \sum_i C_{ij} \lambda_{ij} x_{ij} \rightarrow \min,$$

subject to:

$$\sum_j x_{ij} \leq a_i \quad (i = 1, 2, \dots, m) \quad (1)$$

$$\sum_i \lambda_{ij} x_{ij} = b_j \quad (j = 1, 2, \dots, n) \quad (2)$$

$$x_{ij} \geq 0 \quad (3)$$

where x_{ij} —the part of the capacity of the i th enterprise allocated to the production of the j th product;

C_{ij} —costs of production of the j th type of output by the i th producer;

λ_{ij} —productivity of the i th producer in the j th type of output;

a_i —productive capacity of the i th producer;

b_j —demand for the j th type of output.

In solving the problem of the optimal allocation of orders for the production of electric-welded oil and gas pipes, the Chief Computer Centre of the USSR State Committee for Material and Technical Supply, for example, revealed the possibility of producing approximately 200,000 additional tons of pipes in short supply, as compared with the plan for 1973.

The Design and Introduction of an Automated System for the Planning and Management of Material and Technical Supply

The automated system for planning and managing material and technical supply on a macro-economic scale is based upon the use of rational methods and technical facilities for the automated processing of information and optimal manage-

ment of the processes of supply and sales. It must be an integral part of the general system of economic management, organically linked with the sectoral automated control systems and with the automated system of planning calculations, which, as shown in Chapter III, Volume 1, is being developed within the system of Soviet planning bodies.

The design and introduction of an automated system for the planning and management of material and technical supply is taking place in the following areas:

- the improvement of the organisational, economic, legal and informational bases of management; the selection and creation of basic subsystems;

- the scientific organisation and mechanisation of management on the basis of using technical means and equipment and telecommunications;

- the solution of particular optimisation and information problems;

- the complex design and introduction of the automated system of management at all principal levels in the system of material and technical supply.

The creation of an automated system for the planning and management of material and technical supply requires a systems, complex elaboration of its organisational structure and the provision of mathematical, information and technological facilities. In this connection, long-range forecasting of the development of the material and technical supply system, taking into account progressive forms and techniques of managing the processes of supply and sale, is of great importance.

CHAPTER V

PLANNING THE UTILISATION OF MANPOWER RESOURCES

The plan for labour and manpower is an organic and integral part of the state macro-economic plan and includes planning the size of the labour force, labour productivity and wages. Some of the indicators for the labour plan, such as the targets relating to the growth in labour productivity and the total wage bill, are worked out centrally and confirmed in the macro-economic plan. Others, such as the numbers of workers and the average wage, are planned and calculated by enterprises themselves.

The main task of the macro-economic planning of labour consists in increasing the efficiency of inputs of social labour, which entails both an all-round increase in the productivity of labour and an improvement in the utilisation of manpower resources, and their rational distribution among the different types of employment, regions and economic sectors.

In practice, the labour plan is interconnected with all other sections of the macro-economic plan and, above all, with the production and construction programmes. The volume and rate of growth of production and the scale of capital construction are directly dependent upon the size of the labour force, its skills and the level of labour productivity. An increase in the number of those employed in production or in the service industries depends on the scale of capital investment. The volume of production and capital investment is taken as the basis for determining the future numbers of those to be employed in the various sectors of the economy. The criterion of full employment

is one of the major factors determining the share of accumulation and consumption in the national income. Manpower is an important factor in the location of production.

The labour plan is closely linked with the indicators determining people's standard of living. Employment, job security, working conditions, etc., are the most important factors determining living standards. At the same time, the real income received by a family is the decisive condition for reimbursing inputs of labour, and the main source of this income is payment for work done. An increase in labour productivity creates the necessary conditions for lower-priced output, including consumer goods. The size of the wage bill for work done is one of the main indicators that serve as a basis for compiling plans for retail trade and the provision of social amenities.

In planning practice, manpower resources include: a) able-bodied sections of the population of working age, i.e. men of 16-59 years of age and women of 16-54 years of age, excluding non-employed persons disabled as a result of industrial injury or war, and non-employed men of 50-59 and women of 45-54 who are in receipt of early-retirement pensions; b) persons below or above working age (men of 60 and over, women of 55 and over and young people under sixteen), who work in state enterprises, institutions, organisations, cooperative and social organisations and on collective farms.

1. PLANNING TASKS AND THE SPECIAL FEATURES OF MANPOWER UTILISATION

The main tasks involved in planning the rational utilisation of manpower resources are to maintain full employment of the able-bodied population and a balance between available manpower and macro-economic demand for labour, and to deploy manpower efficiently. The most general criterion for the rational deployment and efficient utilisation of manpower on a macro-economic scale is the attainment in the planned period of optimal rates of extended reproduction and the maximum satisfaction of society's needs with minimal inputs of labour and full employment of the able-bodied population.

The specific feature of manpower planning consists in the fact that the population acts at one and the same time both as the basic productive force and as a consumer of material goods and spiritual values. An able-bodied member of socialist society must be guaranteed work and, at the same time, as a consumer, must satisfy his own needs as fully as possible. That is to say, the problems of employment and level of consumption are interlinked.

Size of population and available manpower, therefore, exert a considerable influence on the correlation between consumption and accumulation in the national income. Excessive growth in consumption due to a higher wage bill can result in a shortage of producer goods, which are essential to the efficient utilisation of manpower, and can destroy the balance between the labour force and the material elements in the productive forces. On the other hand, a slower rise in the consumption level can result in a growth in demand for additional jobs.

Social ownership of the means of production and the planned character of the socialist economy creates the possibility of maintaining full employment of the able-bodied population. This is brought about by taking into account the special features of socio-economic tasks at particular stages.

At the present stage, manpower is becoming a limiting factor in economic growth and, therefore, rational manpower utilisation and higher labour productivity is becoming increasingly important. The next 15-20 years will be marked by a progressively smaller increase in the size of the work force. An absolute fall in natural growth of manpower is expected to begin in the 1980s.

The sources contributing to the total growth in the working population are undergoing considerable change. Formerly, a growth in the number of factory and office workers was ensured by, firstly, natural population growth, and the transfer of manpower from some sectors into others, and, secondly, as a result of drawing into social production able-bodied persons previously engaged in family households. In 1966-1970, this latter source accounted for 25 per cent of the total growth in manpower, and only 1.5 per cent in 1971-1975. In the Ninth Five-Year Plan period, there-

fore, macro-economic demand for additional labour was in the main satisfied by the natural growth in the able-bodied population.

Considerable changes are taking place as regards the professional qualifications and levels of skill of the labour force. The sphere in which semi- and unskilled labour is used is dwindling as a result of the mechanisation and automation of labour-intensive and auxiliary work, and thus making it necessary to transfer workers from some sectors to others and to retrain workers. The inter-sectoral redeployment of the labour force is on the increase, and the retraining of workers is taking place on a larger scale. Under conditions of labour shortage, manpower must be distributed among the different spheres and sectors in such a way as to ensure a forced rate of growth in the most progressive sectors and very high growth rates in the social productivity of labour.

The redistribution of manpower has an important role to play. One of the important tasks facing the economy at the present stage is the economic exploitation of the extremely rich regions in the north and east of the Soviet Union. Solving this problem depends to a great extent on providing these regions with a labour force. In this connection, the plans contain measures for the migration of workers to the eastern and northern regions and for material incentive schemes that will encourage an inflow of people who will settle in these regions.

The compilation of the manpower utilisation plan is preceded by two basic stages—an analysis of labour reserves in the pre-planned period and a forecast of manpower resources and their employment. The analysis, the forecast and planning calculations are all stages in one process, which will result in finding the best variant for the deployment and utilisation of manpower.

2. ANALYSIS OF THE MANPOWER RESOURCES AND THEIR UTILISATION

The regular population censuses, current statistical reports, the census of employment data and sample surveys regarding employment of the able-bodied population are

the main sources used in analysing manpower and its utilisation in the pre-planned period.

The areas of manpower analysis can be listed as follows: the analysis of manpower resources from the demographic point of view. The aim of this type of analysis is to study the factors causing changes in the composition and movement of the population, both natural and mechanical, and to determine the labour activity of various sex and age groups, as well as the degree of participation in social production of persons outside working age;

the analysis of employment by spheres, branches and by economic regions. Such an analysis reveals the basic proportions in the distribution of manpower and its tendencies to change, the overall picture of regional economic growth, the main weaknesses in the utilisation of manpower and the reasons for these;

the analysis of the sources that meet the country's demand for labour. Such analysis makes it possible to assess the part played by the different sources, to select a rational combination of them in the planned period and determine the possible increase in the number of workers from the different sources.

Demographic Processes

The scale and composition of manpower resources are determined above all by demographic factors—size of population, its sex and age structure, etc. To discover the trend in the reproduction of the labour force, therefore, it is necessary above all to study the demographic structure of the manpower resources and ascertain the changes in the composition and migration of the population. The ratio of manpower resources to the population as a whole depends basically on the average length of life. In the last analysis, a change in the size of the manpower resources is determined by the patterns of change of the whole population and its rate of reproduction.

According to the census, the total population of the Soviet Union on 15 January 1970 was 241.72 million, of which 130,487 million, or 54 per cent, were of working age. The years 1971-75 saw the largest natural increase in

manpower resources in the post-war period—1.3 times greater than in the previous five-year plan period, and twice as big as in 1961-65.

Social and economic factors exert a considerable influence on the reproduction of the population. The fertility and mortality rates depend on the material and cultural level of the people, the state and development of education, health and medical services, etc.

Mortality in the Soviet Union is one of the lowest in the world. In 1974, it was 8.7 deaths per 1,000, while in the USA this indicator was 9.1, in Britain 12.0, in France 10.4 and in the FRG 11.7.

However, while there was a significant fall in mortality and an increased life span, fertility also fell, and this was reflected in the rate of natural growth in the population. The actual average reproduction of the population amounted to 0.93 per cent per year in 1972. The fall in the birth rate has been significantly affected, not only by the demographic effects of the war, but also by other factors, such as urbanisation, the increasing employment of women in social production, the higher cultural and educational levels, etc. A low rate of population growth has adverse socio-economic consequences. In this connection, demographic problems are becoming the object of the most careful study on the part of governmental and research bodies, and a whole series of measures are being taken with the object of maintaining and raising the birth rate in the Soviet Union.

The age structure of the population also determines the size of and changes in manpower resources. From the point of view of short-term interests, it is more advantageous for society to have the very highest proportion of persons of working age. However, a low proportion of children would mean a slowing down of the rate of growth of the manpower resources in the future. In planning the size of the population of working age, account must be taken of the fact that manpower resources are affected by the birth rate that existed 16-18 years earlier. At the present time the proportion of persons in the older age-groups is increasing, while the number of young people, and especially children, is on the decrease. This phenomenon, which is characteristic of many industrialised countries, reflects the process

known as the "ageing" of the population, which is linked with an increase in the average length of life and a relative fall in fertility.

On the whole, the structure of the population of the Soviet Union in 1970 is shown by the following figures: children under working age—74.6 million (30.9 per cent of the total), people of working age—130.5 million (54.0 per cent), of retirement age—36.6 million (15.1 per cent).

Over the past few years, the sex composition of the population has been changing towards a decrease in the proportion of women. In 1970, the percentage of men in the total population was 46.1 per cent, as against 45 per cent in 1959. Such a correlation between men and women could be attributed to the older age-groups and was primarily a consequence of the war. Up to and including the age of 43, the numbers of men and women have become equal.

The proportion of men in the rural population is lower than in the towns. In the years 1959-70, the proportion of men in the urban population increased from 45.2 per cent to 46.3 per cent, and in the rural areas, from 44.9 per cent to 45.7 per cent.

As well as quantitative and structural shifts in the composition of manpower resources, qualitative changes are also taking place. Thus, in 1970, practically all the young people entering social production for the first time had completed their general secondary education or specialist training. Whereas in 1959 the percentage of the working population who had received higher and secondary education (full or incomplete) was 43.3 per cent, in 1970 this proportion reached 65.3 per cent.

Migration is closely linked with demographic processes since it is one of the elements generating manpower in different regions of the country. The basic economic function of migration consists in maintaining the quantitative and qualitative balance between supply of and demand for a labour force in the different regions.

In changing the location of manpower, migration exerts an influence on the latter's macro-economic efficiency. It is, therefore, important that a study be made of the migratory movements that have taken place, their direction, intensity and the composition of the migrating population.

The intensity and direction of migration is affected by a wide range of factors, such as climatic and environmental, demographic, ethnic and socio-economic ones. Socio-economic factors, such as differences in standards of living, working conditions and people's daily lives, are of decisive importance. State bodies regulate the regional redeployment of manpower by means of a capital investment policy, regional wage differentials, the provision of social welfare facilities, housing, etc.

The Basic Proportions of Deployment

Efficient manpower utilisation depends to a great extent on improving the proportions of manpower deployment. Economic, social and demographic factors all exert an influence on manpower deployment, the most important of these being the economic ones. The whole range of these factors are taken into consideration, and trends in the deployment of labour in the pre-planned period are analysed, before the proportions of labour utilisation are formulated for the planned period.

The deployment of workers by sectors of production is influenced by output growth rates, the structure of capital investment, and trends in technological advance. Finding the best variant for manpower deployment and utilisation in the planned period is linked above all with the creation of a progressive structure for social production.

The basic proportions for manpower deployment can be listed as follows:

- the size of the manpower resources either employed in the social economy or engaged in education;

- the number of workers employed in the sphere of material production and in the non-productive sphere;

- the number of those employed by sector within the productive and non-productive sphere;

- the number of workers in the different professional and skill groups;

- the size of the manpower resources in towns and villages;

- the number of employed subdivided by region.

Manpower and Employment. In the Soviet Union, the bulk of the labour force (92.4 per cent of the able-bodied population) is employed in the social economy or engaged in education. However, even in conditions of developed socialist society, a section of manpower continues to be employed domestically or privately.

The basic trend in this ratio is towards a reduction in domestic employment, as labour in this field is very unproductive. In this connection, it should be noted that until work in family households has outlived its usefulness from the economic point of view, and domestic labour can be completely replaced by social forms of meeting the demand, it is not permissible to force this process artificially.

Over the country as a whole, the source of labour, such as that created by releasing able-bodied persons from domestic employment, is more or less exhausted. At the same time, the part it plays in some republics continues to be considerable. Thus, whereas in the RSFSR, the Ukrainian SSR, the Byelorussian SSR and the Baltic Republics, the proportion of those employed domestically is no more than 8-9 per cent, in the Central Asian and Transcaucasian Republics it comprises 14-20 per cent. The actual potential labour force to be drawn for social production from domestic and private employment can be established by taking into account the main factors that determine employment in this sphere. A reduction in domestic employment depends above all upon the organisation of educational establishments for the rising generation (networks of day nurseries, boarding schools, etc.) and upon growth in the social amenities sector. Changes in domestic employment are also affected by such factors as uneven economic development in particular regions, migration of population, increased prosperity, etc.

Material Production and the Non-Productive Sphere. The distribution of manpower between these two spheres exerts a strong influence on economic growth rates.

Other things being equal, the greater the number of those employed in material production, the higher will be the rate of economic growth. The figures in Table 8 illustrate the changes that have taken place in manpower distribution

between the sphere of material production and the non-productive sphere.

Table 8

The Proportions Between Those Employed in Material Production and in the Non-Productive Sphere

(in percentages)

	Years			
	1950	1960	1970	1974
Total employed in the economy	100.0	100.0	100.0	100.0
Including:				
in sectors of material production	86.2	83.0	76.9	75.7
in sectors of the non-productive sphere . .	13.8	17.0	23.1	24.3

The increased proportion of those employed in the non-productive sphere is characteristic of the progressive trend towards changing proportions in manpower deployment. The growth of the productive forces and increased labour productivity in material production enables society to direct an increasingly large proportion of its manpower resources into sectors of the non-productive sphere.

Manpower Deployment by Sector. In the sphere of material production, the ratio between the numbers of those employed in industry and in agriculture is of decisive importance. The basic law relating to a change in this ratio is the redistribution of labour, on the basis of a growth in its productivity, from agriculture to non-agricultural sectors (Table 9).

Despite a fall in the numbers working in agriculture, the share of labour-intensive operations is still great there, which is the result of a relatively low level of labour productivity.

The steady growth in the number employed in sectors serving agriculture, with a fall in the number employed directly in agriculture, must be considered a progressive trend.

Table 9

**The Distribution of Persons Employed in the
Economy, by Sector**
(in percentages)

	Years			
	1950	1960	1970	1974
Total employed in the economy	100	100	100	100
Including:				
in industry and construction	27	32	38	38
in agriculture and forestry*	48	39	25	24
in transport and communications	5	7	8	8
in trade, public catering, material and technical supply, sales and procurement	5	6	7	8
in education, health, science, the arts, etc.	8	11	16	16
in administration	3	2	2	2
in other sectors	4	3	4	4

* Including private agricultural plots.

The intra-sectoral structure of employment in industry shows an increase in the proportion of those employed in production of the means of production and, above all, in sectors contributing to technological progress. Thus, over the past 20 years, the greatest increases in this proportion took place in the electric energy generation (by 62 per cent), chemical (by 50 per cent) and engineering (by 32 per cent) industries.

Urban and Rural Population. Migration from the rural areas to the town was and remains one of the main sources

of urban population growth. Growth of the urban and a fall in the rural population is a natural process brought about by economic causes, primarily by the continuing process of industrialisation. It is a reflection of technological progress and the increased productivity of social labour.

According to the 1970 census, over 11 years the urban population increased by 36 million, and the rural population decreased by three million, in spite of the fact that the natural growth in the population in rural areas comprised 18 million in the period between censuses. The growth in the urban population took place as a result of natural growth in the towns, which amounted to 14.6 million in 11 years, by 5 million as a result of the transformation of rural centres into urban ones, and by 16 million as a result of migration from the countryside to the town.

The release of labour in rural areas and its drift to the towns must be organically linked with the mechanisation and intensification of agriculture.

Regional proportions. The General Plan for the Location of Productive Forces in the Soviet Union makes provision for a steady growth in the economic potential of the Eastern regions. In the next ten years, the wide-ranging and complex exploitation of new territories with difficult natural conditions will begin, especially the northern parts of the Eastern regions. The most important task of the state is therefore to attract manpower which will settle in these regions.

By studying the factors that determine the mechanism of migration and the influence of each of them, it will be possible to affect the direction of the migratory movements.

Apart from economic measures, organisational work and the correct selection of the forms of manpower redeployment are very important. The basic forms of regional redistribution of the population are as follows: the organised recruitment of workers and specialists for permanent and seasonal work at enterprises or construction sites, migration schemes, appeals to young people to work at major construction sites and enterprises, the deployment of young graduates from higher educational and specialist training establishments, and vocational and technical colleges.

It is an important task of labour planning to utilise more fully the manpower of small and medium-sized towns.

In present-day town planning, a town with up to 50,000 inhabitants is usually considered a small town, and one with 50-100 thousand inhabitants, medium-sized. In the Soviet Union, small and medium-sized towns account for almost 90 per cent of all urban settlements. In 1970, 44.4 per cent of the urban population lived in towns of this size. In such towns, the proportion of the population employed domestically is usually significantly higher than in large towns. This is in the main connected with shortcomings in the location of production—the extreme concentration of industry in the large towns.

In the Eighth Five-Year Plan period, marked shifts in the location of industrial construction in various regions of the country had already become apparent—approximately 60 per cent of the factories, whose construction was begun in 1966-70, were located in small and medium-sized towns. The industrial development of small and medium-sized towns was continued in the Ninth Five-Year Plan period.

Small specialised enterprises and affiliates of plants and factories operating in large towns are now being built in small towns and industrial settlements. Factories are being located in industrial centres with a view to the rational utilisation of male and female labour.

Proportions in the Skill Composition of Manpower Resources. The skill structure of manpower resources is changing in accordance with the demands of technological progress. The trend of this change is towards a larger proportion of highly skilled workers, a reduction in manual and semi-skilled labour, and a greater proportion employed in industry.

Skilled workers in more than 700 trades are being trained within the system of vocational and technical education alone. In 1975, 1.9 million young specialists, who had completed courses at higher educational and secondary specialist training establishments, were deployed in the economy. Approximately 2.0 million young skilled workers were trained at vocational and technical training colleges. However, the demand for skilled workers has not yet been fully satisfied. In this connection, the demand for machine operators, adjusters, etc., is particularly great, i.e., for workers

in the basic trades, and for workers skilled in a number of trades.

A progressive trend as regards changes in skill composition at the present stage is the smaller proportion of narrowly specialised trades, and the fact that these are being combined, which makes for a more rational utilisation of labour. Efficient utilisation of labour is largely determined by a correct selection of trades. In the past few years, increasing attention has been paid to job counselling for young people in order to bring a worker's knowledge and skill, and leanings towards a particular type of work, into line with the character and content of his work.

Technological progress is linked with yet another very important change in the structure of the skilled work force—it leads to a greater proportion of engineers and technicians and other specialists who are engaged in production. The proportion of engineers and technicians in industry increased in the years 1960-1970 from 9 per cent to 12 per cent, and the proportion of specialists with higher education or secondary specialist training increased from 14.2 per cent to 17.8 per cent of the total number of factory and office workers. The maintenance of correct proportions in the training of specialists in higher educational and secondary specialist training establishments is of great importance.

Sources for Meeting the Demand for Labour

The sources that provide labour for the economy are: a) young people attaining working age; b) persons employed domestically; c) persons of pensionable age who have been drawn into social production. In the past, an increase in the level of employment took place mainly as a result of persons of working age, who had been employed domestically, being drawn into social production. The number of these has fallen from 17.9 million in 1959 to 5.9 million in 1970. Today, the domestic sector as a potential source of manpower is almost completely exhausted. The natural growth in population, which took place in the 1950s, will be exerting an influence on manpower resources in the 1970s. In the 1950s, the average annual growth in the population was 1.76 per cent.

The increase in the length of time spent on education due to the introduction of universal secondary education and the increase in the number of students in higher educational establishments, shortens the working life of the younger generation. Finally, the reduction in the working year as a result of the shorter working week, longer holidays, etc., reduces the total working time of those employed in the economy.

The extent to which the elderly participate in social production depends on social and economic factors. In 1970, this age group accounted for 15.1 per cent of the total population, and it was a still smaller proportion of people working in the country's economy. In the long term, the growth in the number of old people will overtake the total population growth, and the proportion of persons of pensionable age in the manpower resources may grow. The shorter working day and the state pensions policy have a certain role to play in making better use of elderly persons' labour.

3. MANPOWER AND EMPLOYMENT FORECASTING

An analysis of past trends in demographic processes and in the proportions in the deployment of labour makes it possible to work out a hypothesis regarding change in manpower and employment, i.e., to forecast manpower. By means of a forecast, the nature of the most general economic and demographic processes, which reflect the creation of manpower resources and their rational employment, is revealed, and different planning options are found. In this connection, the variants differ from each other, not only by virtue of different quantitative indicators, but also by virtue of concepts of development for particular aspects of manpower and its employment.

There are two distinct, interconnected developments in forecasting manpower and its employment—demographic and socio-economic forecasts.

The task of a demographic forecast consists in determining the potential size of manpower resources and their

sex-age structure, i.e., the starting size for solving problems relating to economic and social development in the respective period. A demographic forecast for the country as a whole is based upon a certain hypothesis regarding the future course of population reproduction, and in the case of particular regions, probable future migration is taken into account. The most complicated aspect of a demographic forecast is taking into account all the factors relating to the birth rate, whose combined influence is expressed in the age-specific fertility rates. The future death rate is determined on the basis of the aging factors, for which mortality tables and a hypothesis of the change in mortality in the different regions of the country are used. An assessment of the future number and size of families is also very important in forecasting population size.

Social and economic forecasting assesses society's possible economic demand for manpower—the quantity and quality of the labour force necessary to carry out the planned economic programme, i.e., such forecasting lays the basis for a hypothesis of changes in the sectoral structure of employment and skill composition. It must maintain a balance between the social demand for labour and the possibilities of its being satisfied. A scientific forecast of the scale and structure of employment must be based both on macro-economic demand for labour and on the demand for work on the part of the future manpower resources.

Foreseeing change in employment structure is the most difficult and complicated aspect of forecasting.

The basic forecasting techniques set out in Chapter II, Volume 1, are also used to a greater or lesser extent in manpower forecasting. Extrapolation, for example, is one of the techniques used for forecasting sectoral employment structure. In particular, a projection of the number of workers employed in material production can be made on the basis of the connection between a growth in labour productivity and the levels of capital- and electricity-intensity. However, extrapolation of the basic trends in sectoral employment structure can suggest a distribution of workers by sector that does not correspond to the possible growth in the work force. As a rule, therefore, a combination of different techniques is used in forecasting. In this case,

in addition to extrapolation, standard calculations are made in which the employment structure is given as a definite target (norm).

Long-range forecasting of the number of employed by sector also consists in modifying—in the light of the target structure—the employment structure that has been obtained on the basis of extrapolation of explicit functions in labour productivity and capital intensity trends. The best variant for the deployment of workers by sector is selected by the technique of successive approximations, made on the basis of the possible manpower resources in the future. An input-output table is a useful instrument for forecasting the sectoral employment structure.

The component technique is a basic method of forecasting the size of population. It consists in a calculation of the future trends in the basic components of population movement—the number of births and the number of deaths. When forecasting the population size of particular regions of the country, additional components must be taken into account—the size of inward and outward migratory movements—in order to assess the net migration.

The migration statistics is not only important, it is also the most complex element in demographic forecasting. Its complexity lies in the fact that regular trends in migration patterns, and the volume and composition of migratory movements that have been observed in the past, cannot be mechanically projected into the future. The use of regression and correlation analysis and extrapolation to forecast migration provides only an initial guideline.

The particular features of the reproduction and movement of manpower and the long-term character of structural shifts make long-range forecasting very important indeed. Medium-range (5-10 year) forecasts of employment structure depend to a significant extent on economic growth in the preceding period and, in particular, on the allocation of capital investments. In such forecasts, the influence of manpower on the rate of economic growth is limited, since an extended period is required to create the conditions for the rational utilisation of manpower.

4. THE TECHNIQUES OF PLANNING MANPOWER UTILISATION

The input-output method is the basic technique for planning manpower utilisation.

In the input-output table for labour, manpower resources are co-ordinated with society's demand, taking into account the most rational deployment and effective use of the manpower. This ensures the necessary proportionality in the sectoral and regional deployment of manpower in accordance with the requirements of the objective economic laws of socialism.

Statistical techniques, in particular correlation analysis, are widely used in labour planning. The building of a multi-factor correlation model, showing the dependence of labour inputs on the complex influence of various factors, helps to determine demand for specialists and skilled workers.

The new trend in the analysis and planning of rational labour utilisation is linked with the use of economic-mathematical techniques and computers which are primarily instrumental in improving input-output calculations. The use of economic-mathematical models and computers also makes it possible to mechanise labour-intensive planning calculations and improve their scientific basis.

In noting the practical use of economic-mathematical models of labour utilisation and the possibility in principle of building them, it should be borne in mind that only the first steps are being made in this area. The widespread application of economic-mathematical models in manpower planning is an important task for the planning bodies.

The Inter-Sectoral Table of Inputs of Social Labour

An inter-sectoral input-output table makes it possible to analyse the inter-sectoral deployment of labour, and the use of computers enables the best variant and manpower utilisation to be selected.

The analysis of sectoral characteristics of the labour input structure provides valuable information as to the ratio between inputs of living and past labour in particular sec-

tors of industry and makes it possible to determine more effectively the areas for savings of social labour in each economic sector.

Thus, the economic indicators for the iron-and-steel industry depend to a great extent on the level of labour productivity in the fuel and transport industries, inasmuch as the labour of more than 600,000 workers in those indus-

Table 10

Labour Inputs in All Sectors of Material Production
(in million workers per year)

Sectors	1959	1966
Inputs of labour in material production—total	79.2	84.0
Including:		
in the production of the means of production	30.0	37.0
in the production of consumer goods	49.2	47.0
Of which:		
in the production of food products:		
in agriculture	26.5	23.8
in the food industry	2.5	2.6
in transport, supply and trade	3.4	4.3
in other sectors of industry	1.6	1.7
Total	34.0	32.4
in the production of clothing and footwear:		
in agriculture	3.4	2.5
in the textile and light industries	3.9	4.3
in other sectors of industry	0.6	0.6
in transport, supply and trade	1.1	1.3
Total	9.0	8.7
in the production of goods for cultural and domestic purposes	6.2	5.9

tries is included in the total inputs in the production of metal. The labour of more than a million transport workers per year is consumed in the production of the output of the fuel industry.

The labour of 440,000 metal workers, 350,000 transport workers and 63,000 workers in the chemical industry, and a total of more than 1.8 million workers in allied sectors is embodied in mechanical engineering output by direct productive links alone.

In addition, in the course of compiling an inter-sectoral input-output table, a vast amount of information concerning standard labour inputs is prepared and systematised, and this can be used effectively for other input-output calculations.

From the figures in two inter-sectoral input-output tables of labour inputs prepared by the USSR Central Statistical Board for 1959 and 1966, assessments can be made of the structure of labour inputs in the production of producer and consumer goods.

The figures in Table 10 show that approximately two-thirds of the inputs of social labour go into the production of consumer goods. A large proportion of the able-bodied population is engaged in food production, which is primarily the consequence of high inputs of labour in agriculture. In 1966, the share of agriculture in the total number of workers employed in the production of food was 73.4 per cent, and for some products this was approximately 90 per cent. It is in this sector, therefore, that there is the greatest potential for further growth in the productivity of social labour and for increased efficiency in production.

The Summary Input-Output Manpower Table

The summary input-output manpower table occupies a central position in the set of labour tables. It is used as the basis for preparing plans for satisfying macro-economic demand for labour; resettlement and labour recruitment plans; and plans for the training of skilled workers by various forms of training. The planning input-output manpower table is compiled on an average yearly basis for the USSR as

a whole, for the Union republics, for autonomous republics and for major economic regions and administrative areas.

The table consists of two interconnected sections. One of these shows the size and composition of the manpower resources, and the other shows their distribution and utilisation. The table makes provision for three types of deployment, reflecting the different socio-economic aspects of manpower utilisation—according to types of employment, according to spheres and sectors, and according to social groups.

The table shows: the section of the population that is employed in the social economy, day-time students of 16 and over, able-bodied persons employed domestically, and other able-bodied sections of the population (independent handicraftsmen and individual peasants, etc.). In addition, manpower and manpower utilisation are represented in the table separately by town and village.

The summary input-output manpower tables by republic, economic region and area, contain additional indicators showing the redistribution of population among the republics, economic regions and areas, and the population movement from the village to the town. Summary tables, from local right up to national level, are prepared on the basis of uniform methodological principles, but are not all equally detailed. The indicators of the manpower tables must be coordinated with the indicators of other sections of the plan and with each other. The table allocates manpower on the principle of main employment.

At the preliminary stage, the summary manpower table is prepared according to aggregate indicators, and in the process of compiling the plan, a detailed table is drawn up. Manpower resources are calculated according to place of residence, and manpower utilisation according to place of work or training. This means that the manpower resources and manpower utilisation can be compared separately by town and by village.

The separate indicators of the planning input-output tables are prepared in the following order: first, the size of manpower resources is determined. Then, macro-economic demand for labour is established, with distribution by sector

and social group. After this, a calculation is made of the able-bodied population that is engaged in day-time training or in family households.

The size of the able-bodied section of the population for the planned period (five years) is calculated by the technique of age shifts on the basis of aging factors.

In determining the number of non-employed disabled people of working age, the main factors taken into consideration are growth in living standards, successes in the field of medicine, improvements in safety at work, and making the work less tiresome as a result of a higher technological level of production.

The number of workers by sector of material production is established on the basis of growth in labour productivity and probable increases in the volume of production. In the non-productive sphere, the number of employed is calculated on the basis of standard labour inputs in accordance with the development of a network of enterprises, establishments and organisations providing the population with cultural and social services and amenities.

The number of day-time students of 16 years and over is established on the basis of the planned numbers of students by type of educational establishment (excluding children who have not reached the age of 16). The planned number of students at the beginning of the academic year is determined as a yearly average.

When estimating the number employed domestically, the "residual" method is used, i.e. the number of those employed in the social economy and in study is deducted from the total manpower resources. This method can only be used in report input-output tables by using actual data. For the planning tables, a more correct method is direct calculation of inputs of labour in man-hours, but the use of this method presents difficulties of a methodological nature. The necessary information regarding time spent by various categories of the population in domestic employment can be obtained at the moment only by means of special sample surveys.

It is impossible to reflect all aspects of the reproduction of manpower in the summary input-output table. As well as the summary table, specific tables are prepared, showing particular aspects of the reproduction of manpower.

Table 11

Schematic Summary Input-Output Manpower Table

	Base period			Planned period		
	total	including		total	including	
		town	village		town	village
I. Manpower resources						
Including:						
section of population of working age (excluding the disabled and persons in receipt of early-retirement pensions)						
working people of older age groups and children up to 16 years of age						
II. Distribution of manpower						
1. By type of employment:						
employed in the social economy; day-time students from 16 years of age and persons employed domestically						
2. By economic sector and sphere of production, total						
Including:						
Sectors of material production, total						
of which by sector						
Non-productive sectors, total of which by sector						
3. By social group (factory and office workers, collective farmers, craftsmen in co-operatives, etc.)						

Calculation of Collective Farm Demand for Labour

This calculation is the basis for determining the demand of collective farms for labour, the sources which will provide them with this labour, and the possibilities of releasing able-bodied sections of the population for permanent or seasonal work in other sectors of the economy. The information in the input-output calculation of collective farm demand for labour is used in planning resettlement. Because of the specifics of agricultural production, such a calculation is made as an annual average and for the peak workload in agriculture. In calculating collective farm demand for labour, provision must be made for ensuring a work force in the periods when agricultural work is at its height, and for a more even utilisation of the work force throughout the year. The possible scale of release of collective farm labour for permanent work in other sectors of the economy or in other regions is determined from the difference between available manpower and the demand of the collective farm social economy for a work force in the month of maximum employment.

Calculation of Additional Demand for Factory and Office Workers

The additional demand for factory and office workers is established in the light of the required growth in their numbers and replacement of losses. Separate calculations of the demand to replace losses are made according to the reasons causing them—migration, and losses brought about by workers leaving for day-time study, army service and completion of the term of the work contract. Additional demand for factory and office workers is satisfied from the following sources:

- 1) skilled workers leaving vocational and technical schools;

- 2) young people leaving eight-year school, as well as those leaving secondary school and not continuing their day-time studies in higher or specialist educational establishment;

3) young people leaving higher educational and specialist training establishments;

4) workers and specialists recruited by enterprises from among persons formerly employed domestically, demobilised from the army, pensioners, etc.;

5) collective farm workers drawn into work in state enterprises and establishments (in regions where there is a surplus of manpower);

6) school children and students employed as workers during their period of production training.

On the basis of the input-output calculations, proposals are formulated for satisfying macro-economic demand for labour, in particular, the plan for organised recruitment and the resettlement plan. The scale of organised recruitment is determined with a view to drawing maximum numbers of local reserves of labour into the economy and providing them with housing and other services and amenities.

Calculation of the Demand for Skilled Workers

In planning practice, the skill composition of workers is determined on the basis of skill categories.

On the basis of an input-output calculation of the demand for skilled workers and the sources that provide them, plans are prepared for training skilled workers according to the form that this training takes—in vocational and technical schools, as well as on the job training.

The additional demand for workers by trade is calculated from the increase in numbers in connection with an expansion of production and the replacement of losses of workers of the different trades. It is established as the difference between the number of workers in the respective trades in the planned period and the base period. The initial data for determining the number of workers of different trades in the planned period is information relating to the quantity and structure of the plant and machinery stock, the plan for the technological development and increased efficiency of production, projections regarding the volume of production and labour productivity, standard labour inputs, as well as the basic trends in the growth of the work force

and changes in its vocational structure dependent upon changes in the plant and machinery stock, established in the course of analysing the vocational composition.

The actual techniques for calculating the number of workers by trade vary according to the specific features of the sector and branch of production. In the case of piece-workers, where there are standard inputs of time per unit of output, the number of workers by trade is calculated by the following formula:

$$L_p = \frac{T_n}{l_w \cdot U_w}$$

where L_p —planned number of workers in a particular trade;

T_n —standard labour intensity of the respective type of work, taking into account the total planned volume of production, standard hours;

l_w —planned allotment of working time per worker, hours;

U_w —calculated coefficient of meeting time quotas.

The demand for workers by trade for enterprises to be commissioned in the planned period is determined separately.

Improvements in the input-output calculation of demand for a skilled work force are to a significant extent the result of a deep and comprehensive study of the skill composition of the work force. On the basis of this input-output calculation, consistent plans are drawn up for the training of a skilled work force and the upgrading of personnel.

Calculation of the Demand for Specialists

On the basis of this calculation, the additional demand for specialists is ascertained, and their training and distribution is planned. The size of the intake of students into higher education and specialist establishments is then determined. The input-output calculation serves as the basis for requests for specialists made by ministries and government departments, and is one of the instruments used in compiling the plan for the distribution of young specialists.

Calculating the additional demand for specialists is a fairly complex problem. It can best be solved, with sound

economic reasoning, at lower planning levels (in enterprises and offices). The general trend is towards a systematic growth in the number and the proportion of specialists in the total work force. This is a reflection of the steadily growing proportion of complex and skilled labour.

For every thousand workers in industry, there were 85 specialists with higher education or secondary specialist training in 1960, 109 in 1965, and 147 in 1970. In 1970, 16.1 million qualified specialists were employed in the economy, of which 6.5 million had received higher education and 9.6 million, secondary specialist training. Nine million specialists were trained in the years 1971-1975 alone.

Demand for specialists depends upon the volume of work and the workload of each of the specialists. The growth and increasing complexity of production, scientific and technological progress, and changes in the organisation of work and management, are the basic factors causing changes in the volume and nature of the work done by specialists in the sphere of material production. In the case of sectors in the non-productive sphere, demand for specialists is determined on the basis of plans for developing the respective sectors, the numbers for whom a service is being provided, and standard workloads. When calculating demand for specialists, provision must be made for the economic expenditure of specialists' working time for purposes directly connected with their field of specialisation.

It is essential to analyse on a macro-economic scale the "saturation" of all sectors with specialists, and to compare this with actual demand.

In planning the demand for specialists, it is important that there should be a valid substantiation as for the ratio between specialists with higher and with secondary specialist qualifications, both on a macro-economic scale and in the different sectors.

There are several different techniques for calculating the additional demand for specialists. For example, this demand can be calculated on the basis of the correlation between the rate of growth in labour productivity and the growth in the number of specialists, as well as on the basis of coefficients relating to the specialist-employment level, showing the number of specialists per 100 or 1,000 workers.

Still another, the so-called "standard staffing method" makes it possible to take account of changes in indicators of the volume of production, its technological and organisational conditions and the development of the civil amenities. The calculation is made on the basis of staff schedules, the standard number of specialists assigned for a particular volume of work, and the range of posts to be filled by specialists. As a necessary condition for the use of this method, there must be a scientifically well-founded standard workload per specialist, and a management system that predetermines the placing of specialist personnel, the number and structure of subdivisions and the number of posts.

5. EFFICIENCY OF LABOUR UTILISATION

In a developed socialist economy, increasing the efficiency of social production, which is primarily determined by the efficiency of inputs of social labour, is a fundamental question in the economic policy of the Communist Party. Labour efficiency depends, not only upon the economic, but also upon the social and political results of labour, which are a matter of principle for a socialist society.

Under capitalism, unemployment exerts pressure on the worker's performance. It helps to increase the labour productivity of an individual worker, but lowers the efficiency of social labour as a whole, as it fails to utilise a significant section of the manpower resources. It is also known that the intensity of labour in a number of sectors of industry in the USA is 1.5-2 times higher than in the USSR. Such intensity undermines the health of the workers and results in premature old age.

Improvements in working conditions, the evening-out of the differences between town and country, the development of the socialist community, and many other social and political aspects cannot be left out of account when establishing the efficiency of labour, in spite of the difficulty of expressing these in quantitative terms. The efficiency of labour, therefore, is a much wider concept than the economic efficiency of labour, which is determined by economic results alone.

The main indicator of the economic efficiency of labour is its productivity. The planned organisation of social labour on a macro-economic scale, and the advantages of socialism, have ensured a higher rate of growth in the productivity of labour as compared with the most highly developed capitalist countries. In the years 1950-1972, the average annual rate of growth in labour productivity in industry per worker amounted to 6.2 per cent in the USSR, 3.5 per cent in the USA, 2.8 per cent in Britain, 5.2 per cent in France, and 4.7 per cent in West Germany. During the years of Soviet power, labour productivity in industry in terms of annual output increased by a factor of 20.7, in agriculture, 5.2 and in rail transport, 11.9. If, however, one takes into account the shorter working day, then labour productivity by the hour increased 31 times in industry, more than 6 times in agriculture, and 17 times in rail transport. About 50 per cent of the increment in the volume of industrial output was due to increased labour productivity in the First Five-Year Plan period, 79 per cent in the second, 69 per cent in the fourth, 68 per cent in the fifth, 67 per cent from 1961 to 1965, and 73 per cent in the Eighth Five-Year Plan period.

In the Ninth Five-Year Plan period, 80 per cent of the increase in national income, 87 per cent in industrial out-

Table 12

	Unit of measurement	1971	1972	1973	1974	1975
Savings in living labour in man-years	million	4	9.8	15.9	23.4	32
in value terms	1,000 million roubles	+5.7	+13.9	+22.5	+33.1	+45
Savings in inputs of raw and other industrial materials, fuel and electricity	"	0.1	+2.6	+4	+5.6	+8
Increased inputs of fixed production assets . .	"	-7.3	-7.9	-12	-15.4	-16

put, 95 per cent in building and installation work, and the entire increase in the volume of rail traffic, was due to increased labour productivity. In the social sector of agriculture, the growth in output was obtained by reducing the number of workers employed in agricultural production.

The changes in inputs of living labour and material inputs in the social sector of production are illustrated in Table 12 (saving +, increased inputs —, as compared with conditions in the base year).

Productivity of labour in the basic economic sectors increased at the following rates:

Table 13

(percentage growth)

	8th Five-Year Plan period (1966-70)		9th Five-Year Plan period (1971-75)	
	over the period	annual average	over the period	annual average
Industry	32.4	5.8	38.8	6.8
Construction	22	4.1	37	6.5
Agriculture (social sector)	37.1	6.5	38	6.6

The Indicators and Methods of Measuring Labour Productivity

The productivity of labour is measured by the amount of output produced in a unit of time, or by the inputs of labour per unit of output. In the macro-economic planning of labour, the most important indicators of labour productivity are those relating to labour productivity in the different sectors of material production and the economy as a whole (the social productivity of labour). Tasks relating to growth in labour productivity in individual economic sectors take the form of directives. The basic planning indicator of labour productivity in all sections of the plan system is the annual commodity output in comparable prices per average worker in the industrial work force. Besides, a system of differentiated indicators can be used. These

are determined by taking into account the specific conditions in each sector, and their use makes it possible to analyse more deeply and ascertain the potential for increased labour productivity in every sector of the economy.

From among the differentiated value indicators, it is possible to use the indicator of net output, etc. The indicator of the social productivity of labour is not a directive but is very important as a basis for making current, five-year and long-range plans and forecasts. It is one of the basic indicators of social production efficiency and is used in planning calculations as a basis for determining the growth rates of the social product and the national income, the growth in personal real income, and in calculations of the economic efficiency of capital investment. It is also closely linked with work on the macro-economic input-output table. This indicator is calculated for the economy as a whole and for the Union republics. It is measured by the volume of national income produced per average man-year in the sectors of material production.

Various methods of planning labour productivity are used, depending on the stage reached in preparing macro-economic plans and the length of the period they cover. In the preliminary stages of drawing up long-range (10 to 20 years), and especially, long-term (up to 5 years) plans, projected growth rates of labour productivity are decided upon, using economic and statistical techniques, for aggregate indicators on the basis of existing ratios between labour productivity, volume of production, degree of electric power utilisation and capital intensity. By studying the trend in the changes that have taken place in the given ratios over an extended period prior to the planned period, it is possible to assume the possible rate of growth and dynamics of labour productivity when forecasting these indicators for an extended period of time.

At the later stages in the preparation of five-year and current plans, the basic method of planning labour productivity is to validate planned targets relating to increased productivity for each factor in turn. The basis of this method is an analysis of the way in which all the major factors influencing labour productivity in the planned period operate, and the determination of economies in labour in-

puts resulting from the operation of each of those factors. The methodological instructions issued by the USSR State Planning Committee with regard to compilation of the state plan for economic development contain for industry, for example, the following uniform classified groups of factors generating growth in labour productivity:

1. The increased technological level of production. This group of factors includes: the mechanisation and automation of production processes, the introduction of advanced technology, the modernisation of existing machinery, the increased quality of output, better utilisation of raw and other industrial materials and the introduction of new, more efficient, types of raw materials, fuels and energy;

2. The improved organisation of production and labour. This group of factors includes: the improved management of production, changes in the specialisation of production and in the related processes, reduced wastage of working time and losses due to defective products, etc.;

3. Changes in the volume and structure of production;

4. Changes in the natural conditions and methods of extracting minerals;

5. Sectoral and other factors, including the commissioning of new enterprises (projects), changes in the regional location of sectors, etc.

The planning calculation of increased labour productivity can be done in two ways: 1) by establishing the increases in labour productivity over the base level as a result of the operation of each factor; 2) by determining the saving in the numbers of workers effected by each factor as compared to the starting (base) number.

Growth in labour productivity as a whole and as a result of all the factors is determined by the following formula:

$$\Delta L_p = \frac{S_t}{N_c - \sum S_i}$$

where ΔL_p —growth in labour productivity, percentage;

S_t —saving in numbers resulting from one factor;

$\sum S_i$ —saving in numbers (taking into account the factors increasing the numbers due to all factors);

N_c —calculated number of industrial workers, calculated for the volume of production in the planned period in output of the base period.

The possible growth in labour productivity in the economy of the Union republics and the country as a whole is calculated on the basis of sectoral labour productivity, taking into account macro-economic factors in its increase—savings in material resources, a lower assets-output ratio, and inter-sectoral shifts in the structure of social production.

It should be borne in mind that all the factors operate in a complex manner, and to determine the influence of each of them in isolation is a complicated matter. As a result, double-counting is possible, and individual factors cannot be taken as quantitatively exact (the development of emulation, improved working conditions, etc.).

The methods of correlation and grouping and the index method are also used in the analysis and planning of labour productivity.

Improvement in the methodology of planning labour productivity—that most important indicator of the efficiency of labour utilisation and production—is an important precondition for raising the scientific content of the plan.

One of the important tasks in the improvement of planning is to ensure fuller and more consistent utilisation of the advantages provided by the economic reform, to apply on a wider scale all the forms and methods of stimulating growth in labour productivity—wages, bonuses and economic incentive funds. One can quote as an example the experience of the Shchekino Combine, where an increase in wages was brought about largely as the result of releasing labour from within the factory.

The preparation and approval of the enterprise's five-year plans increases the interest of the enterprise's collective of workers in discovering the latent reserves for increasing labour productivity. In the past, the lack of long-range plans at enterprises and the unjustified changes in assignments relating to volume and range of the output during the course of a year compelled ministries and enterprises to provide for additional margins of labour to meet possible eventualities. As a result, the number of workers in many enterprises was artificially inflated.

The preparation of a planning input-output table of working time is a pressing and important task. The input-output manpower table that is being used in planning shows not so much the distribution of labour among the spheres where it is used as the distribution of workers. It does not reflect duplicate employment, as workers are allocated to sectors according to their main employment. In agriculture, for example, inputs of labour by workers in other sectors and by students drawn into agricultural work are not reflected. Such a table does not present a correct picture of labour inputs employed domestically or in small private plots either.

This table does not, in fact, reflect the inputs of labour domestically or privately by people who work in the social sector. Moreover, in the different economic sectors, the time worked by each worker during the course of a year varies.

Thus, the input-output manpower table does not give an accurate picture of the actual proportions of inputs of labour according to the sphere where it is used, and it is not possible to use the table as a basis for establishing the optimal deployment and utilisation of labour.

So far, manpower tables by workers' sex have not been compiled. Existing statistical records do not provide the necessary information for this. Such a table would give a clear picture of the size and composition of the section of the population employed domestically, and enable more rational solutions to be found to questions relating to additional sources of manpower and population redistribution.

It is also necessary to improve the system of standard labour inputs, which form the basis of input-output calculations. The importance of having a scientific basis of such standards for planning manpower utilisation is now increasing greatly. The Republican State Committees for Manpower Utilisation, created in 1967 and attached to the Councils of Ministers of the Union republics, have an important role to play in improving manpower planning.

The main functions of these committees are as follows:

the preparation and implementation of measures to discover reserves of labour in the sphere of material production, the retraining of the work force and its redeployment

among sectors and regions in accordance with production demand;

the provision of an employment and information regarding existing vacancies at enterprises;

the study of the composition of manpower resources not employed in social production and the preparation of proposals for their rational utilisation;

the organised recruitment of workers and their resettlement in new areas, as well as checking that economic bodies are fulfilling their obligation to provide the necessary conditions for the new migrants;

and participation in the preparation of draft plans for the location of new industrial projects with a view to the rational employment of the able-bodied population.

CHAPTER VI

PLANNING A RISE IN LIVING STANDARDS

A rise in living standards is the chief, supreme goal in developing socialist production, and is expressed in the plan by means of indicators regarding living standards. It is possible to plan an increase in prosperity because in the Soviet Union the production of material consumer goods by state-owned enterprises and collective farms is planned, the development of the services sector is planned, and incomes derived from social ownership are distributed according to the plan.

1. ECONOMIC VALIDATION OF THE PLAN FOR RAISING LIVING STANDARDS

Living Standards as Reflected in Plan Indicators

Standard of living is usually taken to mean the provision of country's citizens with the material goods and cultural services they need and the degree to which their requirements of such goods are satisfied.

An extensive series of physical and value indicators are used to describe living standards in the various state plans. They include indicators regarding the consumption of material goods and services; the provision of housing, public and social amenities, and transport facilities; the growth of educational, health and cultural services and of social insurance and benefits; the length of the working day and the amount of leisure time; and personal income.

These indicators describing particular aspects of rising prosperity are to be found in nearly all sections of the macro-economic plan. Processes connected with the rise in living standards are reflected in such sections of the plan as those dealing with the development of education, culture and the health service and the growth of trade; the labour plan contains indicators relating to wages; the agricultural development plan—collective farmers' incomes, etc.

Summary Plan for a Rise in Living Standards

The summary plan for a rise in living standards contains, firstly, synthetic indicators which give a summary indication of personal consumption of both material and cultural goods and services: real personal income, social consumption funds, the whole range of services, total consumption of material goods and services, average wages, and the income of collective farmers derived from working on the collective farm and from their own private plots of land.

The plan also includes indicators of the level of personal consumption and provision of different types of material goods and social services (per capita consumption of basic foodstuffs and non-food products; the supply of consumer durables to households; the provision of housing, schools and other child-care establishments, hospitals, etc.). Many of them are derived from gross or sectoral indicators from other sections of the plan. The final group of indicators consists of specific indicators describing different, particular aspects of the nation's well-being that are not found in other sections of the plan.

Living Standards Indicators in the Macro-Economic Plan

The summary plan is finally formulated in the concluding stages of preparing the draft macro-economic plan on the basis of its other sections already drawn up. However, preliminary calculations of these summary indicators are made in the early stages of drawing up the macro-economic plan, as soon as initial calculations of national income, its growth

rates and its distribution into the accumulation fund and the consumption fund have been made.

When current (annual) plans are being compiled, it is not possible to allow for any substantial change in macro-economic proportions, the structure of social production or growth rates. The existing structure of production, its reserves and the economic resources at the disposal of society determine the possible growth of output and rise in living standards during the short-term plan. Projections of higher living standards have only a limited role in the compilation of such plans.

When long-range plans are drawn up, targets for a rise in living standards can be treated as initial data. In fact these goals can be fixed, for example, using estimates drawn from standard family budgets, if such an approach is adopted. In this case the growth rates of different sectors and of the entire economy, its structure and even the period of the plan can be wholly subordinated to the idea of attaining a certain level of consumption.

Five-year plans are the basic form of macro-economic planning. The starting point for such a plan is usually to decide the possible growth of the social product (national income). A different approach may be applied when the five-year plan is regarded as a stage in the long-range plan. However in every case indicators regarding living standards play key role in formulating the plan as a whole and its different sections. Preliminary calculations of summary indicators made at the initial stage of compiling the macro-economic plan serve as guidelines, as basic raw data for working out more specific indicators reflecting the different aspects of an improvement in population's well-being and indicators of the growth of output.

The Validation of Rates of Growth in Living Standards

The first of the many tasks that have to be solved in the course of preparing planning projections in regard to rising living standards is to search out the possibilities and then justify rate of growth in living standards.

Real personal income is the chief indicator of living standards in the various macro-economic plans. We judge rising living standards primarily in terms of the rate of increase in real per capita income.

If we denote total real income by C_t^1 , and the size of the population by P_t , then real per capita income is $C_{pt} = \frac{C_t^1}{P_t}$.

The annual increase in real per capita income is $g = \frac{\Delta C_{pt+1}}{C_{pt}}$, while the increase in real per capita income relative to the previous year is $1 + g = \frac{C_{pt+1}}{C_{pt}}$.

If the number of years in the planned period is equal to t , then real per capita income in the last year of the planned period is $C_{pt} = C_{p0} (1 + g)^t$, where C_{p0} is the real per capita income in planned year (P_t) equal to $C_{p0} (1 + g)^t L_t$, where L_t is the size of population in the planned year.

We can introduce an identity linking the amount of resources available for consumption in the national income (total consumption plus non-productive accumulation) with national income, the share of accumulation and the returns-on-assets ratio:

$$C_t = Y_0 (1 + E^1 a_t)^t (1 - a_t),$$

where C_t —resources available for consumption in the national income in the planned year;

Y_0 —national income in the base year;

E^1 —increment of returns-on-assets ratio;

a —share of productive accumulation in national income;

t —number of years in the planned period.

The casual relationship between resources available for consumption in the national income and the volume of real income can be expressed as follows:

$$C_t^1 = \gamma C_t,$$

where γ is the coefficient of proportionality between total real income and resources available for consumption which can roughly be defined as the share of total real personal income in the resources available for consumption in national income.

Current personal consumption (total personal consumption) and non-productive accumulation by the population (for example, increase in the value of houses owned by ordinary citizens) make up total real income drawn from resources available for consumption. Productive accumulation in the family households (say, an increase in the value of cattle or in private production premises) is also included in total real income. This latter component is however extremely insignificant and can safely be ignored in the early stages of working on the plan so that γ can be regarded as the share of total real income in resources available for consumption. Until such time as some concept of the trend of non-productive capital investments (non-productive accumulation) can be formed, the value of coefficient γ can be determined by establishing a change in it as a function of time or of national income growth rates:

$$t_{\gamma} = f(t_Y),$$

where t_{γ} —rate of change of γ ;

t_Y —national income growth rate.

It follows from the above that total real income $C_t^I = \gamma Y_0 (1 + E^I a_t) (1 - a_t)$ while the absolute level of per capita real income expressed via national income and the material factors in its growth:

$$C_{pt} = \frac{\gamma Y_0 (1 + E_{at}')^t (1 - a_t)}{P_t} .$$

Projections concerning growth of national income and its distribution into consumption and accumulation can be used to determine possible growth rates of real personal income as a first approximation. At the same time a forecast of population growth and changes in its social and sex-age composition can be drawn up. The structure of personal consumption reflecting demand can be determined for the end of the planned period in accordance with the growth of incomes and changes in the structure of the population. The industrial production programme, the plan for agri-

cultural development, the various plans for developing different branches of the services sector, the capital construction plan, etc., are formulated in such a way as to ensure a structure of production corresponding to the projected structure of consumption. An approach of this kind enables people's needs to be met to the fullest extent possible.

Sources and Structure of Income

The second task that has to be tackled in the early stages of compiling a plan in order to validate the rate of increase in material prosperity is to determine the sources of personal income, its structure and type of trends.

To begin with, proportions must be established between different types of income, firstly between incomes derived from social ownership and those derived from family households. Small private plots still play a certain role in people's lives, especially those living in the country, both as a source of income and as a source of supply for foodstuffs—milk, meat, potatoes, and various sorts of vegetables and fruit.

A crucial proportion in income and consumption is that between wages and social consumption funds. A correct, optimal proportion must be established in the various plans between the growth of these two variables in the interests of a successful growth of production and a fast rise in living standards.

As a general rule social consumption funds show the fastest rate of growth. Nevertheless historical circumstances should be taken into consideration in each particular case in determining actual relationships. Thus, between 1959 and 1965 social consumption funds grew very much faster than wage payments, and their share in personal income and consumption increased. Between 1966 and 1970 the increase in these funds was only slightly greater than the rise in wages, and the proportion between them did not significantly change.

In 1971-1975 social consumption funds grew faster than the wage bill of workers, employees, and collective farmers: payments and benefits for the public from social consumption

funds rose by 40 per cent, while the earnings of workers and employees on the one hand, and of collective farmers on the other rose respectively by 20 and 25 per cent. The main way of raising the public income in 1976-1980 will continue to be increase of earnings, which will account for 75 per cent of the total increment of incomes. The policy adopted by the Party and Government in the field of income and consumption is directed at raising the incentive role of wages as well as at increasing working masses' consumption.

The programme of social development and raising of the Soviet people's living standards in 1976-1980 envisages, at the same time, high growth rates for social consumption funds, which are to increase by 28 to 30 per cent and reach the huge sum of 115,000 million roubles in 1980. The proportion of social consumption funds in the national income will rise from 24.9 per cent in 1975 to 25.6 per cent in 1980.

The share of social consumption funds in total personal consumption of material goods and services was about 29 per cent in 1970. If double-counting of services is excluded and social consumption funds are expressed as a ratio of real personal income (consumption), the percentage is much smaller. Thus, in 1970, social consumption funds accounted for roughly 20 per cent of personal consumption, while wages contributed about 70 per cent and privately-earned income slightly less than 10 per cent.

Social needs that have to be met out of wages and out of social consumption funds are taken into account in determining the optimal relationship between these two variables.

A wide range of social needs can be satisfied by increasing average wages and the total wage bill. The following factors have to be taken into account in planning: an increase in the size of the work force; changes in the structure of production and the composition of the labour force; a rise in the average level of earnings in accordance with the growth of production efficiency thus ensuring a material incentive for the working people; and an increase in average pay with a view to eliminating unjustified differentials between different categories of factory and office workers and a gradual rise in the earnings of low-paid workers.

Social needs that cannot be met out of wages are considered in determining the amount of social consumption funds. In this case attention is paid to an increase in the number of people supported out of such funds (for example, pensioners, scholarship students, schoolchildren), the need to improve the provision of pre-school child-care establishments, expand and improve medical services, etc. The value of monetary payments paid for in this way (pensions, scholarships, benefits) should be fixed in relation to the rising level of wages, while invalid pensions should be related to old age pensions, etc.

Once the various needs have been ascertained, it is then necessary to assess their social importance and establish priorities in satisfying the different needs. In doing this, it is very important to decide the extent to which some or other needs have been satisfied (for example, as a ratio of the actual or planned level of consumption to the standard rate of consumption or standard consumer budget that has been fixed).

In preparing projections regarding a rise in living standards it is not enough simply to work out indicators for the population as a whole. Thus in the preliminary stages of compiling a plan, a forecast is constructed of the probable increase in real income for the main social groups—factory and office workers and farmers—on the basis of possible growth rates of real income for the total population.

The most optimal approach to determining the structure of personal income is to carry out iterative calculations in which the first stage consists in splitting gross income into its different components and the second in forming gross income on the basis of forecasts concerning the trend of specific types of income.

At the first stage gross personal income in the planned year is split up into its different components with due regard for the tasks of social development, the need to satisfy the whole complex of social needs to the maximum extent possible and to tackle urgent socio-economic problems. Such an approach is possible because in conditions of socialist production incomes derived from social ownership which can be completely regulated make up the overwhelming mass of personal income.

In the course of solving first-stage problems those variants are chosen that ensure the achievement of the socio-economic goals which have been formulated. Different methods of selection can be used: either by using traditional numerical statistical models or by applying formal techniques and computer-based mathematical models which makes it possible to increase the number of variants quite considerably.

The calculation can be carried out in three steps: the first consists in extrapolation of existing tendencies towards change in the structure of income, the second comprises analysis of the variant obtained, and the third, correction of the original variant in the light of the need to solve the socio-economic tasks facing society, and the working out of a whole number of variants of income structure which are subject to further correction after the second stage of calculations has been completed.

At the first step we regard income structure as a function of its level:

$$\sum_{i=1}^n x_i = f(\bar{x}),$$

where $\bar{x}$ —average level of gross personal income;

x_i —individual components of income.

Proceeding from this, a regression equation is set up that links the level of individual components of income with a level of gross personal income:

$$x_i = f(\bar{x}).$$

The parameters of the regression equations can be assessed from dynamic series data. The various statistical and planning bodies possess the necessary information for a fairly long period of time and there are no particular difficulties associated with applying this method. The results of individual forecasts for each component of income are summed up and if necessary the result is corrected so as to produce a control-figure total (gross income).

A very simple procedure can be used for solving this problem. Thus the total wage bill in total personal income can be determined as a first approximation by establishing

the causal relationship between per capita wages and per capita income. For the period 1954-1970, for example, this relationship is expressed by the following regression equation: $y = 2.5681 + 0.8722x$, where y is the rate of increase in real per capita wages, and x is the rate of increase in real per capita income.

The first variant of income structure is analysed and it is then adjusted to take account of explicit tendencies and social tasks that have not been adequately reflected.

The second step in determining the planned structure of income consists in forming gross income from its different components. The task here is to determine the minimum required growth rates and values of each component of income in the planned period. Thus, as regards income distributed in payment for work, the minimum required limit to its growth rates is decided by production conditions: changes in the structure of production and a combination of factors for raising its efficiency. As regards income obtained from social consumption funds, the lower limit on its increase is determined mainly by changes in the number of such income recipients. It is assumed that the level at which the needs of the total population and its different groups are met should not fall.

The Structure of Consumption and Ways of Increasing Income

The work done in the first stages of compiling a macro-economic plan to validate rates of raising the living standards is completed by a forecast of the structure of consumption in the planned period and its coordination with income and personal needs (demand).

Once the main outlines of the structure of personal consumption have been defined, positive action can be taken in the course of further work on the plan to formulate the structure of production and investment, thus subordinating production to satisfying people's needs.

In the course of work on validating rates of raising the living standards, ways and means of their levelling up in

different regions of the country are carefully examined. For a number of reasons, chief among which are the level of development of production and natural conditions, the standard of living of working people varies in different parts of the Soviet Union. An extremely important instrument in levelling up living standards across the country is the planned differentiation of personal income.

It is normal planning practice, when overall growth rates of total real income and its uses are being determined, to divide the whole of this increase in two. One part is set to ensure the minimally necessary increase in income in accordance with the conditions of providing welfare for the population existing during the period of compiling the plan. The other part of the income increase determines the total amount of funds available for implementing new measures for raising living standards in the planned period.

The income increment needed in unchanged welfare conditions is determined above all by the increase in the number of consumers (increase in the total wage bill due to an increase in the number of factory and office workers with unchanged wages and salaries, an increase in total pensions due to an increase in the number of pensioners, etc.).

The second part of the overall increase in income is used to raise wages and salaries including minimum rates, to increase pensions, benefits, and scholarships as stipulated by law, and to extend the range of beneficiaries.

All sections of the macro-economic plan are worked out in detail on the basis of the original hypothesis regarding economic growth in the forthcoming planned period which presents the case for economic growth rates and proportions including the principal indicators regarding living standards. In the course of this work the values of the different components of personal income are determined on the basis of specific calculations. Relevant data are then collated into summary input-output indicators such as total consumption in available national income, an estimate of real personal income, social consumption funds, etc.

2. PLANNING INDIVIDUAL PERSONAL INCOME

Individual incomes make up the bulk of personal income (about 90 per cent of the total); the most important items are wages and salaries, incomes of collective farmers derived from their work on the farm and individual cash payments from social consumption funds.

Planning Wages

Broadly speaking the planning of wages in the Soviet Union consists in the state and its various bodies establishing conditions of pay, fixing its average level, and allocating expenditure on wages and regulating their payment. Taken in aggregate, these measures do help to ensure a rise in average pay and a correct relationship between wages and the amount and quality of work done.

Rates and scales of pay which form the basis of wages are fixed centrally, usually by the USSR Council of Ministers. Regional wage differentials and handbooks containing information on merit rating: handbooks on skill grading, lists of representative trades eligible for payment of special rates for doing heavy or hazardous work, etc., are also approved centrally. Work quotas (time, output and service rates) are usually fixed along decentralised lines.

Until recently the basic parameters for the different forms and systems of payment were also fixed centrally. Nowadays, under the new system of planning and material incentives, the right to decide such questions of application including the fixing of indicators regarding the bonus system and the size of bonuses has been handed over to enterprises and economic organisations. The only things still fixed centrally are the standard deductions from profits for payment into the enterprise material incentives fund, rules relating to special kinds of bonuses (for example, the awarding of bonuses for new technology, etc.) and the maximum size of bonuses paid out to workers from the wages fund.

The centralised fixing of rates and scales of pay together with the decentralised settlement of questions connected with applying the different forms and systems of pay and

work quotas makes it possible to combine a uniform wages policy with a flexible system of material incentives for people working at enterprises run on an economic accounting basis.

The USSR State Bank exercises control over the use of funds for wages at enterprises, construction sites, state farms, organisations and institutions, ministries and government departments, and by executive committees of local Soviets. Its agencies hand over funds for the payment of wages to enterprises, organisations and institutions in accordance with the nature of their economic operations—to enterprises and organisations which have production plans to fill in accordance with their implementation of these plans, to institutions working on a budget in accordance with the amount fixed for wages.

Average pay and total wages are laid down in the various macro-economic plans. The USSR Council of Ministers approves the total wage bill for the economy as a whole, for USSR ministries and government departments and for the Union republics. USSR ministries and government departments calculate the total wage bill for each Union republic separately. The total amount is then communicated to planning committees in the Union republics so that they make the appropriate input-output calculations. In order to be able to plan the money supply and compile the USSR State Bank's cash plan, the total wage bill including payments out of material incentives funds is approved for each planned year with a quarterly breakdown.

The councils of ministers in the Union republics approve the total wage bill for each of the republican ministries and administrative departments and for each part of the economy—for the areas, regions and the autonomous republics. The wage bill at enterprises, organisations and institutions is approved by Union or republican ministries and government departments to which the former are subordinated.

Wage bills are usually approved for enterprises, organisations, ministries and republics without taking account of the need to implement country-wide measures in relation to wages (a rise in minimum wages, an increase in rates and scales for different sectors and categories of workers, the

additional introduction of regional differentials, etc.). The necessary funds for implementing these measures are allocated centrally to USSR ministries and government departments and to Union republics as a supplement, as these measures are being carried out.

The wages plan is determined either directly on the basis of calculations regarding the size of the working population and the average wage or on the basis of standard wage expenditure expected in the planned period. Thus the plan for wages in the trading sector is fixed as a percentage of trade turnover. It should however be borne in mind that standard expenditure on wages is always determined in the final analysis on the basis of the given level of average wages and the corresponding standard labour inputs (size of the work force).

The level of average wages and the total wage bill are planned on the basis of their structure in the base period, taking into account changes in the structure of production and factors for improving efficiency. These calculations are done for each enterprise and the production association to which it belongs, each ministry and government department, and each sector and branch of production.

In calculating wage bills, the first thing is to fix the average-weighted wage or salary rate in accordance with the type of work and the structure of the labour force. In order to do this, the number of workers paid time and piece rates and the proportion of them paid at higher rates for working in difficult conditions should be decided in the light of the special features of production and the existing (or projected) conditions of pay, and the distribution of workers on the scale of different wage rates and the corresponding average wage-rate coefficient should be fixed. An increase in skills which determines productivity growth and is connected with the introduction of new techniques and technology is recognised by raising the average wage rate.

Next an estimate is made of extra payments for exceeding output quotas and of bonus payments out of wage bills. Their proportionate amount can be determined from the planned level of labour productivity, standard rates in use and the various systems of pay taking into account factors

affecting the growth of labour productivity (output) and economising on material inputs. The size of this component of planned wages will depend on increasing work skills and intensity, and on additional inputs of labour that secure an economising on material inputs. Finally, the size of other additional payments and regional differentials for which an average sector coefficient must first be calculated should be determined.

This calculation of the structure of workers' wage fund during the planned period broken down into its different components is linked up with the calculation of productivity according to the various factors affecting it. In this case the factors of productivity growth (after they have been estimated) can be given as a group which makes it easier to calculate the increase in average wages.

Material incentives funds formed from deductions from profits in accordance with the established quotas are determined in the plans of sectors (ministries, departments), enterprises and associations of enterprises, along with estimates of total wages. These funds are used to reward workers under bonus systems in accordance with current standard provisions, which concern single bonus awards to workers who have distinguished themselves by carrying out some especially important assignments, payment of end-of-the-year awards for overall operational results of enterprises, and contingency assistance to workers.

Payments out of profits are included with wage bills in personal money income and expenditure tables and in calculating real income. Wage bills excluding such payments are however fixed in the form of a directive for each enterprise, ministry, etc. and the use of this part of the total wage fund expenditure is controlled by the USSR State Bank agencies and is liable to adjustment with respect to implementation of the output plan.

Planning Collective Farmers' Pay

The total wage bill and the level of pay on collective farms is decided in the course of drawing up the agricultural development plan. The results of these calculations are incor-

porated in the summary plan for raising people's living standards.

The plan for state purchases of agricultural produce which fixes all the other indicators in this section of the plan forms the basis for the agricultural output plan. Among these indicators input-output calculations of gross and net collective farm income and its distribution, on the basis of which the level of collective farmers' pay is established, hold an important place.

Payments in cash and kind in the basic production activities of the collective farm, in capital construction, in collective farm social-amenity premises (civic centres, libraries, day nurseries, etc.), including paid holidays, make up the total wage fund of collective farmers.

Funds for paying wages are set aside first in distributing farm income. The planned wage fund is divided in two. The first part is used to pay guaranteed wages to collective farmers on a monthly basis for the volume of work done or the amount of time worked, to pay adjustments to tractor drivers for the skill category and the seniority, and to give extra pay for harvest work.

If farms do not have sufficient funds of their own to make these guaranteed payments the USSR State Bank grants them 5-year credits. The amount of credit is determined by the difference between the total of guaranteed wages and the farms' own funds earmarked for this purpose in production and financial plans.

The second part of the fund is earmarked for paying farmers for the results of their work (quantity and quality of output) and for making additional payments for achieving particular indicators (quantity and time of completion of work, etc.). The size of this item of the fund is established in accordance with the conditions of production and the farm's economic possibilities within the limits of 15-25 per cent of guaranteed wages.

Guaranteed money payments are made on the basis of wage rates and scales applicable for similar work in state agricultural enterprises. On collective farms which distribute income in accordance with man-days worked (in cash and kind) guaranteed payments are made on a scale similar to the rate paid to a top-category piece-worker doing similar

work on a state farm. On this basis wage rates are established for the different skill grades, expressed in terms of man-days. In both cases income is distributed in accordance with the grades laid down in the wage-rates handbook for state farms, and piece-work output quotas are also established in accordance with rates operating on state farms.

All wage funds are calculated in money terms; produce given or sold to collective farmers is valued at state retail prices.

Planning Individual Incomes from Social Consumption Funds

Pensions, benefit payments, and students' grants are among individual incomes financed from social consumption funds. They amount to about half these funds.

Pensions are the chief form of social security for people not capable of work. Pensions chiefly take the form of old age pensions, invalid pensions and maintenance payments in case of loss of the bread-winner.

When drawing up macro-economic plans, the total amount of pensions appears in the calculation of real personal income and in the balance of personal money income and expenditure; estimates are made for different types of pension in compiling the latter. The total amount of pensions is also incorporated in the indicator of social consumption funds. Much more detailed planning calculations are made in drafting the state budget and the social insurance budget.

The number of pensioners and the average level of pensions constitute the basic indicators for determining the total amount of expenditure on pensions. Since the current estimate normally reflects the number of pensioners on a specific date (beginning or end of year), the average annual number of pensioners in each category is used in planning calculations. For this purpose forecasts of the size and changes in the sex-age composition of the population and of families in the planned period, of the incidence of disease and trends in the number of invalids, the number of working pensioners, etc. have to be made. Account should also be taken of projected changes in pension legislation affecting the increase in the number of pensioners, for example, the

lowering of the pensionable age for particular categories of workers, etc.

Average pensions during the planned period are fixed on the basis of a study of base period data and factors which may affect changes in pensions. These include changes in pension legislation, in particular an increase in minimum pensions; an increase in average wages on the basis of which future pensions are fixed; an increase in the general and the uninterrupted length of service of persons of pensionable age; changes in the average number of dependants per pensioner; structural changes in the composition of pensioners affected by production and natural factors. The average level of invalid pensions and maintenance payments in case of loss of the bread-winner is also affected by changes in the proportion of different invalid categories in the total, average structure of families, which lost the bread-winner, etc.

Temporary disability benefits including the special category of maternity benefits are another form of individual income obtained from social consumption funds. Since the trends and standard rates of payment for these benefits are different, they are usually calculated separately in planning practice. Total payments are determined on the basis of data about the total number of days lost due to temporary disability, the average number of days lost per 100 insured workers and the average amount of benefit.

Benefits are also paid in the Soviet Union to mothers of large families and to single mothers, to help in the adoption of children and in taking care of the mentally ill; to chronic invalids; special child allowances are paid as well as death benefits; grants are made for a stay in a convalescent home or in lieu; one-time grants are paid out to trade union members from trade union funds for a particular purpose, and collective farms too pay out benefits to their members.

In accordance with the decisions taken at the 24th Congress of the CPSU in 1974, child allowances have been introduced for families where average income for each member of the family does not exceed 50 roubles a month.

The third type of individual income financed from social consumption funds are grants payable to students at higher

and secondary specialised educational establishments, technical and vocational schools and colleges, advanced-studies medical institutes, to postgraduate students, etc. Grants are paid out of the state budget and out of enterprise, collective farm, cooperative enterprise and social organisation funds.

The total amount of grants is decided in the course of planning current expenditure on educational establishments. One of the basic methods used in calculating the appropriate planning indicators is to establish standard expenditure per student including the size of his grant.

Calculating the Balance of Personal Money Income and Expenditure

The outcome of calculating the different types of money income is summarised in the balance of personal money income and expenditure. This balance incorporates all receipts of money by the population from state, social and cooperative enterprises and personal expenditure through the payment of money for goods and services to these enterprises and institutions, as well as expenditure on payment of taxes, contributions, etc. and savings.

The balance helps to establish the correct proportions between personal money income on the one hand and retail trade, the volume of services that have to be paid for, and savings by working people, on the other. The data included in the balance are also used for compiling the USSR State Bank's cash plans, financial plans and the state budget. The balances take roughly the form shown in the table below.

This balance is also compiled in an expanded form, with a social breakdown which traces the flow of money between different social groups. This flow has no effect on the total volume of purchasing power.

Besides wages, the money income of collective farmers, and pensions, benefits and students' grants, the income side of the balance shows receipts from sales of agricultural produce to the state, cooperatives and collective farms. Personal money income is also derived from receipts from the financial system including insurance payments, loans for individual housing construction and repair, resettlement

grants, etc., interest payments by savings banks and the USSR State Bank, state lottery prizes and repayment of loans. The item "Other receipts" brings together income from various sources: bonuses and other types of pay not included in wages, the payment for business trips, receipts from the sale of goods through the state-run secondhand shops, etc.

Table 14

Balance of Personal Money Income and Expenditure
(conventional figures, million roubles)

Money income	Total	Money expenditure	Total
1. Wages	700	1. Purchase of goods . .	780
2. Collective farmers' money income . . .	80	Including:	
3. Receipts from sales of agricultural products . . .	20	from state and cooperative shops. . . .	710
4. Pensions, benefits . .	150	from collective farms . . .	70
5. Grants for students . .	10	2. Payment for services . .	150
6. Receipts from financial system	20	3. Obligatory payments & voluntary contributions	50
7. Other receipts	20	4. Savings	10
Total	1,000	Total	990
Decrease in personal money balance	—	Increase in personal money balance	10
Balance	1,000	Balance	1,000

The following items of personal money expenditure are given in the table:

purchase of goods from state and cooperative shops and from collective farms;

payment for services, including rent, household bills (water, gas, electricity), payments for the use of all types of transport and communications, the purchase of tickets for

the cinema, theatre and other places of entertainment, fees paid by parents for the use of child-care establishments, payments for a stay in a sanatorium or a rest home, payments for various personal services (laundry, hairdressers', photographs), etc.;

obligatory payments and voluntary contributions which include personal taxes and customs and excise duties levied on the population, contributions to social and cooperative organisations, social insurance contributions, the repayment of different types of loan;

personal savings calculated from the increase in deposits in savings banks and the USSR State Bank, and purchases of 3 per cent government bonds.

The increase in savings during the planned year is estimated on the basis of base-period data showing the relationship between this indicator and the general rise in personal money income.

The amount of money available to the population for acquiring goods from state and cooperative shops and from collective farms and for paying for the services of state and cooperative enterprises and service establishments can be ascertained by excluding obligatory budgetary payments and voluntary contributions and the increase in money savings from total personal income. Next the proportion of expenditure on goods and on services and the volume of potential demand for both goods and services can be determined.

Techniques have now been developed for building a model of the expenditure side of the balance of personal money income and expenditure. The principle which underlies it is to combine data regarding trends in personal expenditure over a number of years and data on regional expenditure. The model represents a set of multiple regression equations linking the various types of personal expenditure with factors affecting it. This type of model helps to overcome some of the deficiencies of demand forecast models in which demand for goods is studied and determined independently of demand for services and which fail to take into account other components of personal expenditure. Use of this model can help strengthen the theoretical validity of the structure of expenditure given in planning input-output tables of personal money income and expenditure.

3. THE CONCLUDING STAGES OF COMPILING A SUMMARY PLAN FOR RAISING LIVING STANDARDS

Detailed calculations of the macro-economic input-output table and of overall, synthetic indicators regarding living standards—personal real income, social consumption funds, etc.—are drawn up on the basis of the results derived from compiling practically all sections of the macro-economic plan.

Calculating Real Personal Income

A numerical statistical model showing the movement of all components of personal income in the course of national income distribution and redistribution is used to calculate real income. This model reflects the increase in total real personal income and its various components, the proportions obtaining between different types of income and ways of its growth, between income in cash and in kind, between commodity and non-commodity consumption, between individual and social consumption, and the proportion between personal consumption and accumulation out of individual income.

The total obtained from this calculation of real income in the personal sector indicates its final share in national income and reflects the relationships that exist as regards national income distribution between the population as a whole on the one hand and the state, collective farms, and cooperative and social organisations on the other.

This planning calculation is usually done along the lines shown, in abridged form, in Table 15.

In the actual work of calculating real personal income, data is usually drawn from the input-output table of personal money income and expenditure. Bonuses paid out of special funds, per diem allowances or additional wages in their place, earnings of hired and seasonal workers in agricultural artels, etc., which are included under "Other receipts" entry in the input-output table, are grouped in the item "Wage-type income" when calculating actual income.

Table 15

Model Table for the Calculation of Real Personal Income
(conventional figures, 1,000 million roubles)

	Base year			Planned year		
	total	including		total	including	
		factory and office workers	peasants		factory and office workers	peasants
1. Money income—total	147	124.3	22.7	212	179.9	32.1
Including:						
wages	107	103	4	156	151	5
wage-type income . . .	5	4.5	0.5	7	6.3	0.7
pensions, benefits, grants	15	12	3	21	16	5
receipts from financial system	5	4.8	0.2	7	6.6	0.4
money income from collective farm work . .	15	—	15	21	—	21
2. Money income not spent on acquiring goods (excluded from total money income)	20	17	3	30	24	6
3. Change in personal savings (increase —, decrease +)	2	1.5	0.5	3	2.3	0.7
4. Money income spent on acquiring goods (1—2+3)	125	105.8	19.2	179	153.6	25.4
5. Income in kind from collective farms in comparable prices	3	—	3	4	—	4
6. Income from private plot (net output) in comparable prices	15	6	9	15	8	7
7. Material consumption in services sector in comparable prices	15	12	3	22	17	5
8. Consumers' benefits from fall in prices	—	—	—	5	4	1

Table 15 (continued)

	Base year			Planned year		
	total	including		total	including	
		factory and office workers	peasants		factory and office workers	peasants
9. Final (actually utilised) income in comparable base-year prices (4 + 5 + 6 + 7 + 8) . . .	158	123.8	34.2	225	182.6	42.4
10. Population, million . .	230	173	57	250	200	50
11. Per capita real income, roubles	687	716	600	900	913	848
12. Real income growth, percentage	100	100	100	131	128	141

Receipts from the sale of agricultural products by small-time private producers to the state, cooperatives or collective farms are not included in money income since they are counted as part of the value of receipts in kind from collective farms and private plots, nor are receipts from selling goods to secondhand shops, from selling scrap, etc. included, since they do not add to real personal income.

Payments into the budget such as taxes and duties, contributions to state insurance funds and the repayment of personal loans, membership dues to social and cooperative organisations, and the purchase of lottery tickets, are included among money income not spent on acquiring goods which are excluded from nominal income so as to avoid double counting.

Part of money income not spent on acquiring goods is spent on payment of services. All such payments including rent and household bills are excluded in calculating nominal money income, while the value of the corresponding material goods is added on in separate entries.

Next the total figure obtained for income is adjusted for changes in personal savings: an increase in savings reduces, while a reduction in savings increases final income. This

item includes the net result of operations with 3 per cent government bonds, changes in deposits in savings banks and the USSR State Bank, and changes in cash balances held by the population.

Money expenditure is then adjusted for changes in hire purchase credit: an increase in credit outstanding means an increase in final income, whereas a decrease means a reduction in final income in a particular year.

In calculating real income for each Union republic an additional calculation should be made for the redistribution of personal funds among the different republics.

Once all these additions and subtractions of the different types of personal money income and expenditure and the necessary adjustments have been made, we obtain a figure for total personal income available for the purchase of goods. This figure constitutes the monetary part of personal final income. Its physical equivalent are those goods acquired by the population from state and cooperative shops and collective farms.

Income in kind which people obtain from collective farms and private plots is the next component of final personal income. Income from private plots is calculated as the net output obtained from agricultural production (which constitutes the bulk of income from small-time private ventures), from individual construction (resulting from the increase in value of individual housing and production buildings), and from other occupations (hunting, fishing, forestry, and handicraft production sold to the general public). This item also includes the value of construction undertaken by housing cooperatives.

The last component of final personal income shown in the table is the value of material consumption in the service sector. It includes the material costs of establishments serving the general public, the physical depreciation of state-owned dwellings, the consumption of electricity, gas, and water, and consumption in the course of using other services.

Total final personal income is thus made up of money income spent on acquiring goods, the value of income in kind and the value of material consumption in the sphere of services.

Real personal income taken as a whole without any breakdown into different social, economic or job categories reflects the relationship between the population and the state, collective farms, cooperatives and social organisations as regards the distribution and redistribution of national income. In fact income obtained by the entire population from the state (from state enterprises, organisations and establishments as well as from social and cooperative organisations based on social ownership of the means of production) and from collective farms enter into the calculation of total real personal income. Interrelationships between different social groups of the population arising during the distribution and redistribution of income are taken into account in calculating real income by social group. No account is taken in income tables in use at the present time of income redistribution between different economic and job categories within the principal social groupings or between individuals.

The population is divided into social groups for the purpose of calculating income in accordance with the kind of family an individual belongs to. The social status of an entire family is determined in accordance with the social position of the head of family. Only two social groups are distinguished in the calculation and planning of income: factory and office workers and peasants. The families of collective farmers and individual peasants are classed as peasants. It would be more correct to classify factory and office workers as "Factory and office workers, and other persons" since under the existing method of classification the incomes of self-employed craftsmen, religious officials, and a whole number of other persons who are neither factory nor office workers have their income included in this group. However, in view of their small number, their inclusion has practically no effect on the level and trend of factory and office workers' income while it considerably reduces the work of calculation.

The basic principle to be observed in calculating income by social group for the base period consists first of all in determining the volume of total personal income and only then classifying it by social group. Different types of income (or deductions from income) are distributed between factory

and office workers and peasants on the basis of past statistical data and information from family budget surveys; in some cases data is taken from special sample surveys.

Calculations regarding the causal relationships between a change in a particular type of income and the trend in another or several other plan indicators affecting that income are usually used in determining the different components of income and expenditure for different groups of the population over the planned period. Thus total wages of factory and office workers and members of peasant families during the planned year are determined in the light of the share of total wages received by peasant families in the base year with due regard for changes in the proportionate size of the peasant population. Similar methods based on a preliminary estimate of the total of each income are used in fixing other types of income and expenditure by different social groups.

It is not possible to make a direct comparison of final personal income at different periods of time since to do so they would need to be expressed in comparable prices.

In order to recalculate total personal income in comparable prices it can be grouped in roughly the following way: 1) final money income; 2) income in kind; 3) material costs of establishments serving the population; 4) physical depreciation of state-owned dwellings; and 5) consumption of water, gas, and electricity.

The monetary part of final income and the current material costs of establishments providing personal services can be revaluated by dividing the corresponding values by previously calculated price indices, while the income-in-kind component, the physical depreciation of housing and the fixed assets of establishments serving the population can be revalued by a direct estimate in comparable base-year prices.

Another method of revaluing final income in comparable prices consists in calculating a general price index for all material goods consumed or accumulated by the population.

The initial data for calculating income in the base period is an estimate in prices of the corresponding years. For this reason it is first of all necessary to determine price changes and only then the physical amount of income on the basis

of the price indices obtained. For planning calculations the initial data is always an estimate in comparable prices (usually in base-year prices). In this case money income is directly expressed in roubles in accordance with the purchasing power of the corresponding (i.e. planned) year. However, all material goods and services including those acquired by the population are expressed solely in comparable prices. This affords an opportunity for determining the probable scale of changes in retail prices, and then for calculating appropriate price indices through a direct comparison of the projected volume of money income and the equivalent provision of goods.

The margin available for reducing state retail prices and implementing measures to raise living standards which were not estimated in the original calculation can be determined through a comparison of personal money income and the volume of retail sales. It should be remembered, though, that if the final part of money income is calculated by the above method, it must be increased by the amount of personal receipts from sales of agricultural product to the state and to collective farms, of goods through secondhand shops (and other such buying agencies), and of scrap in order to compare it with available stocks of goods.

The overall scale of price reductions and their direction should be decided at the same time. The structure of consumption and demand for goods also depends on the structure of income, and the social and sex-age composition of the population. It may be that the volume of goods available corresponds to the total amount of personal money income, but if the structure of goods does not correspond to the structure of demand then not all of these goods will be sold while demand for other goods will remain unsatisfied. Obviously in such a case steps should be taken to increase the production of goods in short supply and reduce the price of goods of which too many have been produced. The more surplus goods there are in stock in relation to demand, the more their price has to be lowered and consequently the general level of retail prices. This in turn means fewer opportunities for directly raising personal money income.

Statistical and mathematical models can be used to determine the structure of consumption and demand,

Calculating the Indicator for Social Consumption Funds

Social consumption funds constitute that part of consumption in national income which is used to satisfy the needs of members of society which cannot be satisfied out of wages.

Such funds consist of two component parts: the first part represents expenditure on the current maintenance of social and cultural establishments (excluding expenditure on investment and major repairs) and the replacement of the depreciated assets of establishments providing free and discount services; the second part comprises expenditure on individual payments (chiefly monetary) which do not represent payment for work done. The volume of expenditure on the first count is determined and validated in the course of compiling the plan for developing the corresponding branches of the services sector, while that of the second type of expenditure is decided in the course of planning pensions, benefits and grants. Social consumption funds include expenditure on material goods and services provided free or at a discount to the population from all kinds of sources: from the state budget, and from the funds of state and cooperative enterprises, establishments and organisations, collective farms, trade unions, and social organisations.

Social consumption funds are calculated as shown in Table 16.

Expenditure on the care and education of the rising generation includes expenditure by the state, collective farms, cooperative and social organisations on day nurseries, children's homes, nursery schools, all types of schools, Young Pioneer camps, as well as maternity benefits, and special allowances for mothers of large families and single mothers.

Expenditure on the training of specialists and workers includes funds for the maintenance of higher educational establishments, secondary specialised training establishments, vocational and technical schools and other establishments for manpower training, as well as for the payment of students' grants.

Expenditure on health and leisure facilities provides for the maintenance of polyclinics and hospitals, health resorts,

Table 16

The Calculation of Social Consumption Funds
(conventional figures, 1,000 million roubles)

	Actual figures for 19	Planned figures for 19
1. Care and education of young people	10	15
2. Training of manpower	5	7
3. Health and leisure facilities	12	18
4. Care of elderly and disabled persons	11	15
5. Provision of social, cultural and household services	4	6
6. Total—volume of social funds (1 + 2 + 3 + 4 + 5)	42	61
7. Of which		
a) money payments	22	29
of which pensions, benefits, and grants	20	29
b) material goods and services	20	30
8. Distribution of social funds by social group		
a) expenditure per member of a worker's family, roubles	195	260
b) expenditure per member of a peasant family, roubles	150	225

rest homes, tourist centres, mountaineering camps, guest houses, and sports facilities, as well as for the payment of benefits in the case of temporary disability.

Expenditure on the care of elderly and disabled persons includes pensions, benefits, and expenditure on the maintenance of homes for the elderly and disabled. Expenditure

on the provision of social, cultural and household services consists of expenditure on the maintenance of cultural and educational establishments as well as subsidies for the maintenance of state-owned dwellings.

Payments by individuals for the care of children in nursery schools, day nurseries, and boarding schools, and for a stay at a resort or rest home are excluded from the corresponding items of expenditure by the state, collective farms and social organisations in calculating social consumption funds. Once total funds and their allocation have been calculated, changes in the structure of this expenditure are analysed. In order to do this, the share of monetary payments to the population and the share of expenditure on the maintenance of establishments providing social, cultural and personal services are determined.

Total Consumption of Material Goods and Services

Personal consumption is made up of the consumption of material goods and the consumption of services. Indicators of total consumption in national income and of real income reflect the consumption of material goods. The consumption of services is estimated and planned by branch and type of service. Total personal consumption can be expressed by a value indicator showing the total consumption of material goods and services.

This indicator can be used to show the ratios that exist in the consumption of material goods and services: for example, the share of consumption financed out of wages and out of social consumption funds can best be determined in this way. Mistakes connected with different structures of consumption can be avoided when comparing living standards in different regions of the country, if this indicator is used. Such mistakes are unavoidable if the consumption of material goods and that of services are viewed independently of one another.

Total consumption is made up of the value of material goods and services which may be consumed by the public and a monetary estimate of personal services.

The value of material goods and services is equal to the volume of personal consumption (to use the terminology adopted by the USSR Central Statistical Board) excluding the value of physical depreciation of state-owned dwellings. The monetary estimate of services includes the value of material costs at establishments serving the public and the value of physical depreciation of state-owned dwellings, as well as an estimate of what are called net services. This latter term covers the inputs of living labour by workers in the service sector.

In this instance all kinds of services, provided for the general public, in which material costs form components of total personal consumption and are part of real personal income, belong to the service sector. Excluded from this category are trade and public catering, productive types of household services, and the domestic supply of water, gas and electricity which belong to the sphere of production.

When calculating the summary value indicator for services, the volume of services in those sectors in which payment is predominant is estimated from receipts by the establishments and enterprises concerned, while the volume of services in sectors and for types of services which are mainly provided free or at a discount are estimated from expenditure by the state and collective farms on the maintenance of these service outlets.

Besides the above-mentioned value indicators regarding the general well-being of the public, calculations are also made of real wages and salaries, retail price indices and service tariffs, a summary index of the cost of living (by which is meant a general index of prices for goods acquired by the general public at state and cooperative retail outlets and from collective farms), and tariffs for services provided by service enterprises and establishments owned by the state, cooperatives and collective farms.

Work on formulating the plan for a rise in living standards is concluded by fixing the length of holidays and by determining physical indicators of consumption and the provision of material goods and services which are derived from total and network indicators taken from other sections of the macro-economic plan.

4. PLANNING THE DEVELOPMENT OF THE SERVICE SECTOR

An improvement in the provision of services to the population is envisaged in macro-economic plans as the productive forces become more developed and society's resources grow in size. Demand for different types of personal services as reflected in rational standards forms the basis for this type of planning just as in the case of defining the volume of production and the sale of goods.

In planning, a distinction is made between services that must be paid for (housing and household services, transport and telecommunications, entertainment, etc.) and services which are paid for wholly or mainly out of social consumption funds (education, health service, certain types of cultural facilities).

An indicator showing the increase in personal income and thus possible demand for different types of services that have to be paid for is used in drawing up plans for developing these services. The extent to which free services should be developed depends on the need to improve the provision of social and cultural services in accordance with the needs of the economy and the population.

Let us take a closer look at planning in the most important branches of the service sector (education, culture, health, etc.). We shall start with the primary-level planning of pre-school education.

Planning Pre-School Establishments

About 10 million children attended day nurseries and nursery schools in the Soviet Union in 1973. Besides the state-run network financed from the state budget, there is a network of permanent establishments run by collective farms. Moreover, day nurseries and playgrounds are organised in the summer holidays which cater for over 5 million children. The state network alone takes in about a third of the total number of pre-school-age children in the country. On average 300-400 roubles is spent every year on each child; parents pay between 15 and 25 per cent of this cost, the rest being borne by the state.

The number of children at such places is decided with the aim of meeting demand as fully as possible on the basis of data about the number of children of pre-school age, the number of working women aged between 18 and 44 years, and with regard to the need to draw housewives into social production.

The state planning commissions in the Union republics draw up draft plans regarding the development of pre-school establishments for the republic as a whole and separately for each town and village irrespective of which organisation they come under but classifying separately those which cater for the children of people working at the enterprises and organisations operating on an all-Union scale on the one hand and on a Union republican or republican scale on the other. This enables the planners on the one hand to determine the extent to which children in the particular republic are provided with places at these establishments and on the other to submit proposals to all-Union and Union republican ministries and government departments about earmarking funds to increase the number of such establishments.

The plan for increasing the number of pre-school establishments and places at them is backed up by the targets for opening day nurseries and nursery schools financed out of state funds. The increase in the number of children placed in such establishments during the planned period should correspond to the plan for increasing the number of places as a result of new construction.

Planning General Education Schools

All forms of training embrace around 90 million persons or nearly 35 per cent of the Soviet population. The number of general education schools is 172,000, of trade, vocational, and technical schools 6,100, of specialised secondary schools 4,300, and of higher educational institutions more than 800. The number of pupils in general schools is more than 49 million, and in evening schools for young workers around 5,500,000.

The following indicators are among those used in the plan for general schools: the number of primary, eight-year

and secondary schools, boarding-schools and extended-day schools and groups; the total number of pupils grouped by the level of instruction classes (I-IV, V-VIII, IX-X); the number of pupils living in hostels attached to schools; an average number of pupils per class within each three levels of instruction; the size of entry to classes I and IX and the number of pupils successfully completing classes VIII and X; the number of shifts, etc.

These details are necessary because standard costs per pupil vary considerably according to the level of instruction and type of school. For this reason even small structural changes (given the tens of millions of pupils) can lead to miscalculations in planning material, financial and manpower resources.

Planning Secondary Specialised and Higher Education

In the Soviet Union the training of specialists with secondary specialised and higher education is undertaken on a large scale. Whereas in 1950 2.5 million students attended higher educational establishments and technical colleges, and in 1960—4.5 million, in 1975 there were about 9.4 million.

The basic indicators for this section of the plan are the targets for enrolling students at secondary specialised and higher educational establishments, for the graduation of specialists, and the commissioning of teaching and laboratory buildings. At the same time the councils of ministers in the Union republics and USSR ministries and government departments responsible for these establishments transmit calculated indicators regarding the number of students there, the additional demand by economic sectors for specialists in various trades and other calculations of the same kind backing up draft plans for the intake and training of and additional demand for specialists.

The actual plan is worked out on the basis of properly-validated additional demand for specialists with due regard for the prospects of growth in different sectors of the economy and in the cultural field. An essential feature of the meth-

odology used in determining this demand consists in having to make an estimate of this demand for the five-year period ahead (or in the case of a five-year plan, for 10 years ahead), since it takes five years on average to train a specialist.

The number of graduating specialists is planned for each calendar year (from January to December inclusive) taking into account the number of students on the various courses and the possible number of dropouts. The latter is calculated with reference to recent data, while the causes are analysed and measures drawn up for reducing it.

The number of students is calculated at the beginning of each academic year for the different types of training. In order to determine the number of students, the number of dropouts on all courses and the number of graduates are deducted from the number of students at the beginning of the preceding academic year and the number of first-year entrants is added on.

The plan for the deployment of young specialists is calculated on the basis of data about the output of specialists and the additional demand for them in different sectors of the economy.

Cultural Establishments

All kinds of libraries, all types of civic centres, museums (apart from science and history of art museums), parks of culture and rest, zoos, planetariums, folk art centres, lecture halls, and lecture centres are all listed as cultural establishments. The macro-economic plans approved by the USSR Council of Ministers and the councils of ministers in the Union republics usually include assignments for increasing the activities of mass cultural establishments — public libraries and clubs run by the ministries of culture in the Union republics.

The plan's main indicators are the assignments for expanding the network of public libraries and increasing their holdings of books, and for expanding the network of clubs.

The chief planning tasks as regards state-run civic centres include improving their location throughout the country in the light of population density, the size of the area they serve, and the capacity of their recreation facilities.

At the present time there are more civic centres than there are village Soviet offices. For this reason there is a need to strengthen their material and technical basis and to improve the conditions for holding lectures, organising interest circles, and for providing reading material, especially newspapers and magazines, etc. New civic centres should provide rooms for meetings and film shows, a library, a reading room, and rooms suitable for interest circle activities.

The macro-economic plan incorporates assignments connected with the shooting of films, the development and functioning of a cinema network, and with strengthening the material and technical basis of the film industry. The rational location of cinemas and the correct organisation of their work is an important aspect of the plan for the film industry.

Indicators of the number of average daily broadcasting hours are used to reflect the development of radio and television in the macro-economic plan.

The main task in planning for the publishing industry is to meet public demand for books, magazines, and newspapers as fully as possible. The main indicators of growth in this field are: the number of book titles, the sizes of prints and the average length of book; the number of magazines published, the number of issues and their circulation per issue and over the whole year; the number of papers published, the number of issues, and the circulation per issue and per year.

The special features of determining demand for books are connected with the fact that, firstly, readers' demand is substantially satisfied through public libraries and reading-rooms and, secondly, available holdings of books enable them to be used many times over.

Planning the Development of the Health Service

In the Soviet Union free medical services are provided by the state. An extensive network of health treatment and prevention and public hygiene centres ensures that medical assistance is available to everyone.

The USSR is first in the world in number of doctors. Around 800,000 doctors are occupied in caring for the health of the population, or one-third of all the doctors in the world, and 2,400,000 nurses. At the beginning of 1975 the number of hospital beds had reached 3,000,000.

In 1975, 48 million factory and office workers and members of their families were treated or stayed at sanatoria and other health resort facilities. More than 20 million children and adolescents holidayed during the summer in pioneer and school camps and at camping sites, or went to summer holiday areas with children's institutions. In accordance with the decisions of the 25th CPSU Congress, during the next five years, the achievements of modern science and new methods of diagnosis and treatment will be more widely introduced into medical practice. There will be an improvement in preventive medicine, and the public's demand for medicines, medicaments, and surgical appliances will be more fully met.

The main planning task is to satisfy the demand for medical services and for rest and recreation facilities as fully as possible. The crucial indicators are: number of hospital beds, number of doctors, number of attendances at polyclinics, and number of places at convalescent homes and rest and recreation establishments.

Planning tasks regarding an expansion of the network of hospital beds, and the commissioning of hospitals, outpatient polyclinics, and homes for elderly and disabled persons are laid down in the macro-economic plan.

Indicators showing the development of the health services over the planned period are fixed on the basis of actual data about the existing network of treatment and prevention institutions, immunisation and inoculation centres, chemist's shops, convalescent, health resort and recuperation establishments and rest and recreation centres. The demand for such places is established by studying the extent and nature of illnesses, the sex-age composition of the population, the specific conditions of industrial and agricultural production in the various regions of the country, regional distribution of the population, etc.

The number of hospital beds and doctors furnishes positive evidence of the provision of these crucial forms of med-

ical assistance, but are also used in planning the development of a network of medical establishments, calculating the number of auxiliary staff, and allocating material and technical supplies and financial resources. They serve as initial data for determining budgetary appropriations, supplies of medicines, equipment, furnishings and fittings, food, etc., and standard staffing ratios.

The draft plan for hospital beds is drawn up for the Soviet Union as a whole, for each Union republic, and USSR ministries and government departments with a breakdown into beds in urban and rural areas, and into beds for the mentally ill. An expansion of existing hospitals by building separate blocks and units and modernising old buildings on the existing area and the construction of new ones is envisaged in the plan. New city hospitals should be designed to hold some 400-1,000 beds and rural hospitals should have space for between 300 and 600 beds. This will make it possible to create district general hospitals capable of treating all the main types of disease.

The main aim in planning the network of establishments dealing with infectious diseases is to strengthen existing services by expanding them, supplying them with new equipment, organising laboratories, and providing them with special transport facilities.

The supply of medicines and medical goods forms an important part of the plan to improve the health service. The idea is to increase the number of chemist's shops serving the general public (including those operating on a profit and loss basis), pharmaceutical stores and special shops for selling medical equipment, instruments and optical goods.

The main indicators as regards convalescent, health resort and recuperation establishments are the number of beds at health resorts and the number of places at rest and recreation centres.

In order to arrive at some estimate of the number of people attending health resorts and rest homes, reference is made to data about the number of beds (places) at maximum capacity, the number of days open to patients in the course of a year, and average length of stay. This helps to fix their volume of work, their intake capacity in the course of a

year or season, and the volume of finance and amount of supplies required.

A calculation is also made of the number of people visiting guest-houses, tourist centres and mountaineering camps. The number of children staying at pioneer camps is estimated separately.

Housing and Social Amenities

The Soviet Union holds a leading position in the world for the volume of its housing construction and the number of flats built per 1,000 inhabitants.

The Guidelines for the Development of the National Economy of the USSR for 1976-1980 envisage the completion and occupation of between 545 and 550 million square metres of housing, improving of the quality of housing construction and of the planning and comfort of homes. Building is proceeding at an exceptionally fast pace in the eastern and northern regions of the country.

Alongside the expansion in state-financed construction, housing cooperatives are increasing in number and conditions are being created for individual house-building in both town and country. Considerable sums of money are being allocated for the improvement of social amenities and services.

Housing construction is the main source for increasing the stock of housing. The macro-economic plan fixes targets for commissioning general-purpose and living space and the number of flats out of centralised and decentralised state funds, housing cooperative funds, and personal funds, and with the help of state loans.

The possible volume of individual housing construction on collective farms financed out of their own money by collective farmers and members of the rural intelligentsia is also estimated.

The construction of students' hostels, boarding schools, etc., living accommodation for staff employed in transport and at other installations, living space in public buildings (flats in schools, hospitals, etc.), and permanent living quarters converted from buildings not originally designed for

housing are all included in the volume of housing construction other than houses and permanent hostels.

The macro-economic plan also contains assignments relating to the development of social and public amenities; expansion of water supply, sewerage, central heating, domestic gas supply, and hotel development. The work of establishments providing services of this kind can be improved not only by installing new capacity but also by making better use of existing capacity and by expanding and modernising it. In view of the fact that demand for some of these services fluctuates in the course of the year, their capacity is calculated on a peak-period basis.

Indicators in the plan for developing the state-run telecommunications system are as follows: volume of telecommunications services in monetary and physical terms; the network of enterprises and service points; the length of telephone and television cables on inter-city lines, and of cable and radio-relay lines; the capacity of telephone exchanges, including automatic ones, and of radio broadcasting stations; the number of radio-transmitting points on the state and the collective farm network; and the number of television stations with 1 kW capacity and more.

5. PLANNING RETAIL TRADE

The Soviet people obtain up to 80 per cent of material goods for their own personal needs through the trading network. The quantities and quality of goods which pass from production to the sphere of personal consumption as a result of sale and purchase are reflected in the indicators for retail trade.

By retail trade is meant the sale of goods to the public for their personal needs in exchange for their money income.

Retail trade is engaged in by the state, cooperatives and collective farms. State and cooperative retail trade, accounting for over 90 per cent of total turnover is determined in the macro-economic plans. Collective farm trade is not planned.

Retail trade is continually increasing as personal incomes rise and the production of mass consumer goods expands.

Total Volume of Retail Trade

The total volume of state and cooperative retail trade constitutes an important synthetic indicator in the macro-economic plan. Retail trade covers:

the sale of consumer goods for cash or on credit primarily by retail trade outlets and public catering establishments;

the value of clothes and footwear made to order in dress-maker's or shoemaker's shops out of their own materials;

payment for different types of domestic and personal services; repair of flats, clothes, shoes, TV sets, radios and other household items, and receipts for making clothes and footwear out of customer's own materials.

The total figure also includes the sale of food to children's establishments, hospitals, etc. and the sale of non-food goods, primarily for economic requirements, to various organisations, establishments, enterprises and collective farms. Total sales of goods to such bodies, known as small-lot wholesale trade, comprise about 5 per cent of the total volume of retail trade.

Within the system of consumers' cooperatives, the sale of agricultural products purchased and accepted on commission at contract prices is also subject to planning. The value of this trade in 1970 for the country as a whole was about 1,000 million roubles. The fact that this indicator is singled out is due to the particular circumstances surrounding the generation of these goods for sale to the public and the existence of noticeable fluctuations in volume from year to year depending on the situation in local markets.

Retail trade planning rests on a correct determination of personal purchasing power available for the purchase of goods from state and cooperative shops and the availability of goods for sale to the public out of the projected volume of production, exports and imports of goods.

The input-output table of personal money income and expenditure is used in calculating the purchasing power during the planned period (five-year or annual). The volume and structure of available goods over the planned period (five-year, annual) are determined by compiling tables for different goods and a summary table showing the supply of goods to retail trade outlets.

Using data from the personal money income and expenditure table, the volume of state and cooperative retail trade is calculated as follows (notional figures):

	(million roubles)
1. Money income	1,000
2. Non-goods expenditure (payment for services, obligatory payments, voluntary contributions, savings)	210
3. Increase in personal cash balances	10
4. Personal purchasing power available for goods ($4 = 1 - 2 - 3$)	780
Of which purchased from:	
state and cooperative shops	710
collective farms	70
5. Volume of state and cooperative retail sales to the personal sector (4a)	710
6. Purchases of organisations, establishments, enterprises and collective farms (small-lot wholesale)	50
7. Total volume of state and cooperative retail trade ($5 + 6$)	760

Retail trade is determined in both base-year and current comparable prices.

Personal money transfers (money flows) between economic regions due to a wide variety of reasons (business trips, holiday journeys, seasonal migration) constitute a particular feature of planning retail trade in the republics and regions.

Determining Total Demand for Goods

Total demand for goods to ensure the volume of state and cooperative retail trade projected under the plan is determined roughly in accordance with the following table (million roubles; notional figures):

Volume of retail trade	760
Increase in stocks of goods in retail trade (given a constant ratio)	22.2
Replacement of losses due to natural wastage	1.5
Price reduction on outdated models	4.0
Reserve stocks held against an expected reduction of retail prices and other demands	37.5
Total demand for goods	825.2

Total demand for goods exceeds the volume of retail trade. The size of the difference depends primarily on the scale of retail price reductions that is foreseen for the planned period. The question of the scale of the reduction for consumer goods is decided in the plan as part of a review of the general problem of the rise in people's material well-being.

The increase in stocks over the planned year is calculated in accordance with the scheme reproduced in Table 17.

Table 17

Calculating an Increase in Stocks
(notional figures; million roubles)

	Base year	Planned year
1. Retail trade plan, fourth quarter (approx. 27% of annual plan)	190	210
Including:		
hire purchase sales	160	179
average daily HP sales, fourth quarter (total turnover divided by 90 days)	1.8	2.0
2. Current standard stock, fourth quarter:		
in trading days	84	86
in total (daily turnover times standard in days)	151	172
3. Stocks (in addition):		
a) delivery ahead of schedule	5	6
b) seasonal storage	9	9
c) belonging to public catering establishments	1.5	1.7
Total stocks (2 + 3a + 3b + 3c) . .	166.5	188.7
Increase in stocks over the year (188.7 - 166.5)	—	22.2

Standard stocks held by state and cooperative retail trade organisations include current stocks held by retail trade

outlets, in goods warehouses, in refrigerated stores and in transit. It excludes seasonal stocks and stocks delivered ahead of schedule which are credited by a special arrangement.

The Structure of Retail Trade

Once the total demand for available goods has been determined, an estimate is made of the structure of trade and the capacity of the market for food and non-food products. Market capacity is defined as the volume of retail sales of specific goods given a certain amount of effective demand. In turn, this effective demand is determined by the purchasing power of the population and the level of retail prices. The structure of retail trade and effective demand is planned with reference to calculations regarding the structure of total personal consumption of material goods. This is necessary since not all consumption is satisfied through the trading system, for part of it is supplied in kind.

In the course of economic analysis all goods included in the structure of retail trade are combined in groups possessing similar attributes describing certain changes in their sales over the cycle. Base time series of adequate length are determined for each of these groups and extrapolation is done on this basis in order to forecast demand.

As we have seen above, consumer demand changes under the impact of a large number of factors, which cannot all however be incorporated in a dynamic model of demand. For this reason they are subdivided into two groups. The first group usually includes factors such as those which can be expressed quantitatively, for example, personal income, retail prices, physical consumption and some others. The second group of factors forming a time trend* includes: the level of production; historical, climatic and national features of development; changes in fashion and consumer habits, etc.

Different types of multi-factor dynamic models using multiple regression equations are employed for actual com-

* A time trend describes changes in the structure of demand over a long period. It is calculated by smoothing dynamic series by the use of logs, in which time (years) is the independent variable.

puter calculations of the planned structure of retail trade (effective demand). The most common type of equation is:

$$Z = a_0 + a_1 l_1 + a_2 l_2 + a_3 t,$$

where Z — chain indices relating to the sale of specific goods;

a_0 — free term;

l_1 — chain index of personal income or total trade;

a_1 — coefficient of elasticity of demand from income demand or total trade;

l_2 — relative change in the real price index (the real price index is calculated by dividing the individual index by the general price index);

a_2 — coefficient of elasticity of real-price demand;

t — time;

a_3 — time trend.

Additional factors such as receipts of food products from small private plots and collective farms, the income structure of particular groups in the population, and the proportion of family budgets spent on particular goods, can be included in this type of model.

The parameters of the equations should be regarded as pure coefficients of the elasticity of personal income or of total retail trade (a_1) and of real price (a_2). The elasticity coefficients show that for a one per cent increase in income or trade (at constant prices) expenditure on the purchase of a commodity (also at constant prices) increases by a_1 per cent, while for a one per cent rise in the real price index, expenditure on purchases drops by a_2 per cent.

Pure coefficients of the elasticity of demand from total trade (a_1) and from price (a_2) calculated from dynamic series of trade statistics (Soviet state and cooperative trade) for the period 1950 to 1971 are given in Table 18 by way of illustration.

It is evident from a look at the figures that the trade coefficients are positive, while the price coefficients are negative. The value of the coefficients largely depends on the extent to which the influence of other factors is fully eliminated.

Calculations regarding the structure of effective demand (trade) undertaken in the economic-mathematical models can be done for the country as a whole and for each Union republic, region, and town.

Table 18

Pure Coefficients of the Elasticity of Demand Versus the Total Trade Turnover and Prices for Selected Goods

Goods	a_1	a_2
Meat, poultry	1.49	-0.80
Fish	1.10	-0.70
Animal fats and oils	1.66	-1.03
Milk and other dairy products . . .	1.21	-1.77
Confectionery products	1.15	-1.30
Bakery products	0.48	-1.67
Groats and beans	0.47	-1.40
Potatoes	0.55	-0.47
Wine	1.15	-1.76
Cotton fabrics	1.15	-1.41
Woollen fabrics	2.29	-2.45
Silk fabrics	1.66	-1.47
Clothes	1.68	-1.04
Knitwear	1.44	-1.63
Footwear	1.39	-1.80
Perfumery	1.07	-0.70
Haberdashery	1.06	-0.90
Furniture	1.50	-1.84
Books and periodicals	0.89	-1.60

The forecast of the structure of effective demand produces the best results in current planning for goods that enjoy relatively stable demand. In compiling five-year plans the data obtained for certain goods for which demand is not completely satisfied should be corrected using the appropriate adjustment coefficients.

These coefficients are fixed after an analysis has been made of data regarding the movement of stocks and after a comparative evaluation has been made of the trading structure of various organisations and regions throughout the country where relatively more favourable conditions have emerged for meeting the public demand for all kinds of consumer goods and of the trading structure of organisations and regions where, despite the fact that other conditions are

similar (level of income, retail prices, etc.), demand is as yet not fully satisfied.

Models of demand for goods can also be constructed from data drawn from budgetary statistics in the form of consumption (demand) functions reflecting the relationship between income level and level of demand for a particular commodity.

Consumption (demand) functions are determined firstly for the base year and separately for factory and office workers and for peasants. A simple regression equation can be used for goods which reach the public through state and co-operative trade outlets: for example, $y = a + bx$, where y is the level of demand (purchases) for a particular item calculated per head (member of the family) within a particular social group, and x is the level of per capita income. In the case of goods which are also supplied through the collective farm market, from small private plots or from collective farms in kind, the demand function can be expressed as a regression equation, for example of the type $y = a + bx + cz$, where x and y have the same values as before, and z is per capita consumption of a particular item out of receipts from other sources. The parameters of these equations are calculated by the least-squares method on computers.

Next the population is distributed by level of per capita income and social group. Then a balance is struck between the volume of acquisition (consumption) of a particular item and personal income in accordance with data taken from trade statistics (in particular purchases of the item in question), the macro-economic input-output table and the personal money income and expenditure table (in particular personal income). The demand functions that are calculated for each commodity are corrected in the light of these results.

In order to determine the volume of demand for a commodity during the planned year, a calculation is made of the income-level distribution of the population in this year. In the light of the previously obtained demand functions, the mean values of demand per capita are found for each of the groups enjoying a different level of material well-being within the social groups. The values obtained are multiplied by the size of the population in each group and the products are summed. The final total shows the volume of

demand for a particular item in the planned year with reference to the growth in average income level in each social group and changes in the social structure of the population on condition that the retail price level does not alter in comparison with the base year for the plan.

With this method consumption (demand) functions can reflect demand expressed both in physical and monetary terms.

If, using this method, a demand function is constructed for all goods (product groups), we obtain a demand (consumption) model. The most fruitful use for this model is in the differential table of personal income and consumption (expenditure). Such a table shows the structure of personal income and consumption as a whole and broken down into main social groups (factory and office workers, peasants) and within the latter groups into subgroups with different standards of living. It consists firstly of a differential income model in which types of personal income are numerated in the subject, classified, say, by real personal income, while population groups are shown in the predicate. The second constituent model in this table is the differential consumption model whose predicate coincides with that of the income model but in which types of consumable goods and services are given in the subject—goods by product group and services (both in monetary terms).

The model of the distribution of the population according to income level forms an integral part of the differential table; the model of family structure is an important but not absolutely essential component.

A model of consumption (purchases from state shops) can be constructed by making a preliminary estimate of consumption (demand) functions in keeping with the above method.

A consumption (demand) model based on the use of a differential table rests on the assumption that the structure of consumption by persons with unchanged level of real income is more or less constant. However, with the passage of time this structure changes even if only a little. Thus, in long-range planning correctives are introduced into the model which take account of the impact on the structure of consumption (demand) of changes in the sex-age composi-

tion of the population and other factors leading to changes in the structure of consumption (demand) given unchanged real income. By comparing differential models of consumption, one of which corresponds to personal demand while the other corresponds to the expected availability of consumable goods and services, the main direction and scale of price reductions during the planned period can be determined.

Differential tables of this kind open up tremendous opportunities for validating other planning decisions in the field of raising living standards and developing the production of consumer goods and improving the service sector.

Input-Output Tables for Consumer Goods

Tables are drawn up for the most important items of food and non-food products in order to establish correct proportions between available resources of a particular commodity (product) and the demand for it and in order to determine retail stocks of them, in accordance with the following scheme:

Resources	Allocation
Stocks held at the beginning of the planned period	Retail stocks
Production	Industrial manufacture stock
Imports	Non-retail stocks
Additions from reserve	Including:
Other receipts	a) industrial consumption
	b) stocks held by state budget organisations
	c) special clothing stocks
	d) other consumers . . .
	Exports
	Reserves
	Stocks held at the end of the planned period . . .
Balance	Balance

This scheme is revised for certain goods depending on the specific conditions affecting their production and consumption.

Input-output calculations for foodstuffs are done in physical indicators and for non-food products in physical and money terms.

The USSR State Planning Committee is responsible for drawing up tables, subject to confirmation by the USSR Council of Ministers, for such major goods as flour, cereals, sugar, vegetable fats and oils, all kinds of fabrics, clothing and knitwear, leather footwear, furniture and so on.

In accordance with procedures laid down in 1957, livestock products (meat and meat products, milk and other dairy products, eggs) are planned in the Union republics. Tables showing state-held resources of these products are worked out by the USSR State Planning Committee in order to fix the scale of deliveries to the state stockpiles in the light of the need to ensure stocks of livestock products at the macro level. Input-output calculations are also made to determine the overall and per capita consumption of meat, milk, eggs and the size of retail stocks of these goods. Similar calculations are made for other products.

The summary estimate regarding the availability of goods combines total retail stocks of food and non-food goods available for sale to the general public over the planned year.

Retail Trade Table

All stages in the movement of goods through the trading network are reflected in the input-output table of trade. It is required to coordinate the sources and uses of available goods earmarked for sale to the public. The table is drawn up for a wide range of goods and product groups listed in retail trade.

An important question in planning the supply of goods is to make a correct estimate of the wholesale and retail stocks required. To this end standards regarding the size of stocks

for each good (in trading days) are drawn up showing how many days of uninterrupted trade can be guaranteed from a given stock of goods.

The trade table can be used to keep track of the movement of stocks for each item and to plan ahead for measures to speed up the sale and reduce the level of excessive stocks for certain goods and the replenishment of stocks back to normal for others.

The Supply and Demand Table

In order to make certain that the production of goods corresponds to demand on the market and to provide economic validation for the required level of retail prices, an input-output table showing supply and demand for consumer goods is drawn for the country as a whole, for each republic and major administrative area and covers a range of food and non-food goods included in the basic statistics of the structure of state and cooperative retail trade. Data concerning personal demand are determined on the basis of a forecast of the structure of effective demand (trade turnover) obtained by using one of the above-mentioned methods.

Supply (the assumed size of sales) of a specific item during the planned period is set at the level determined by input-output calculations in accordance with projected volumes of production, imports, exports, non-retail consumption, increase in stocks and other indicators included in the calculations for the retail trade table.

When the early variants of the supply and demand table are constructed, inconsistencies may appear between the availability of certain goods destined for sale to the public and expected demand for them. In such cases the question is raised of seeking out resources for an additional increase in production and imports or else for a reduction in non-market consumption and exports of those goods for which demand cannot be satisfied. If supply exceeds demand, measures are proposed for a possible change in product range, or retail prices, and either imports are cut or exports and non-market consumption are increased.

Consumer Budgets

In order to provide back-up data for the development of personal consumption and retail sales, wide use is made, along with other methods, of consumer budgets when compiling macro-economic plans for the long-term period ahead.

A consumer budget is a summary, overall economic indicator describing the volume and structure of personal consumption of material goods and services in a given year.

Rational budgets are calculated on the basis of well-founded consumption norms: for food products, the most important kinds of non-food goods, the basic kinds of home appliances, rational samples for the remaining types of non-food goods and standard rates for chargeable services. Certain factual data about consumption are also taken into account when drawing up a budget.

Consumer budgets can be constructed for the entire population, for different social groups (workers, collective farmers, pensioners, etc.), and for groups of people enjoying a different level of material well-being; and separately for urban and rural populations. All these budgets can be compiled for the country as a whole, for each Union republic, administrative or economic region.

The use of consumer budgets in planning creates the necessary conditions for a more careful validation of the structure of retail trade and its coordination with the structure of consumption.

In determining the volume and structure of trade, the part of goods supplied to the public through the state and cooperative retail network is calculated separately. The calculation is done according to the following table (million roubles; notional figures):

1. Consumption of material goods and services, total population, according to consumer budget	1,000
2. Consumption out of social funds and other sources, other than consumer budget funds	150
3. Consumption out of income in kind from collective farms, small private plots, crafts and occupations	70

4. Consumption out of proceeds from collective farm market sales inside the village and outside	70
5. Volume of purchases by organisations, establishments, enterprises and collective farms (small-lot wholesale)	50

Total volume of state and cooperative trade (1-2-3-4+5)	760
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The volume of trade for all principal goods is calculated in accordance with the same principle.

Consumer budgets compiled for each Union republic and administrative region are used as the initial base for validating the long-range plan for the development of personal consumption and trade in different economic regions of the country.

CHAPTER VII

COST AND PRICE PLANNING

In a socialist economy the key monetary indicators of cost, profit, and price are both an instrument and an object of planning. The standard amount of socially necessary inputs required for the production of goods (use values) of a certain quality, satisfying some or other human need, constitutes the initial value determining their macro-economic (sectoral average) level. Parameters (level, structure, ratios) are consciously set for planned cost (of wages and producer goods), profit, and price that act as economic incentives and in certain instances as economic guides to encourage production work forces to undertake a systematic search for and bring into use all possible reserves for increasing labour productivity, making economies in the use of material resources, and improving the quality and the volume of commodity output.

In the new conditions of the economic reform the methods used in planning the monetary and financial system as a whole are continually being improved. Calculations of economic efficiency, monetary estimates of the results of economic activity and the long-term standard rates to be applied in material incentives schemes are assuming greater importance in the practice of macro-economic planning.

All this, in turn, makes far greater demands on the economic verification of the plan and, in the first place, on the reliability and authenticity of information about production costs. Although the planning target for cost is not issued as a directive, an improvement in the economic validation of

this synthetic indicator is a necessary condition for further improving planned price formation and the entire system of economic levers used in the centralised management of the economy.

Great importance is attached to an analysis of production costs in determining the amount of national income, compiling the financial plan and the state budget, and in ascertaining a whole series of other macro-economic quantities expressed in monetary terms. All this shows the need for further improving the methodology of compiling and validating planned cost calculations.

1. COST PLANNING

Production costs represent the total current money expenditure by a production association (enterprise) on the design, production and sale of output. In their economic aspect they characterise the conditions of simple reproduction. The methods used in calculating this indicator vary according to the length of time for which the plan is compiled (annual or long-range) and according to the object of planning (average for a sector or an enterprise). This chapter deals with methods of planning calculations for production costs at the macro-economic level and individual republics and ministries, i.e., aggregate calculations reflecting the basic trends of changes in cost under the impact of factors of macro-economic or sectoral importance.

Planned cost calculations provide for the rational use of material, labour and financial resources with a view to achieving the target volumes of production and sales with the least cost or, conversely, ensuring the greatest volume of production and sales, given the amount of resources allocated.

They undergo the following main stages:

analysis of the existing level of costs and of those factors that exerted a decisive influence on their formation in the base period, and an assessment of possible reserves for making economies;

evaluation of the effect of the most crucial factors on the movement of costs in the planned period;

generalisation of information obtained regarding changes in the various standard costs and calculation of the long-term level of costs.

Depending on the particular circumstances and tasks, the following indicators are determined:

- a) cost per rouble of commodity (sold) output;
- b) cost of different types (groups) of goods and services;
- c) level and structure of output costs for each component of cost (estimate of production costs);
- d) reduction in the cost of comparable commodity output.

Cost Calculation at the Stage of Processing Raw Information

It is usual at the present time to make much wider use in long-range planning of the analysis of economic efficiency (the comparative evaluation of costs and benefits) as applied to different variants of output growth at the stage when raw information is being processed. The cost indicator is one instrument used in this type of analysis. Since there are as yet no final data at this stage regarding the volume of production and investment and there are no series of calculations available about the expenditure of specific resources, the indicator of the cost per rouble of commodity output for each ministry (sector) and republic has to be fixed in approximate terms with the help of the index method in the following way.

Aggregate (sectoral) standard cost ratios in the base period are analysed according to their separate economic components: raw and basic materials, auxiliary materials; fuel; power; depreciation; wages and social insurance contributions; other money expenditures. Next the most important macro-economic factors affecting aggregate standard cost ratios in the planned period are ascertained and indices showing changes in them under the influence of these factors are set. Finally aggregate standard cost ratios are calculated for the different components per rouble of commodity output in a sector during the planned period.

Under this scheme the greatest difficulties arise when setting indices for changes in the cost ratios of separate economic components of cost. Such a calculation is underpinned

by multi-factor analysis of the qualitative and quantitative relationship between production inputs and stable shifts in the structure and quantities of output, manufacturing equipment, techniques, and the organisation and location of production, and changes in the monetary and financial system and conditions of pay.

The impact made by key technical and economic factors on the level of costs is calculated at all stages and levels of planning and this forms the basic method for fixing the planned cost of commodity output. The main factors exerting a substantial influence on the trend of costs in industrial output at the macro-economic and sectoral levels include a rise in the technical level of production; an improvement in its organisation; an increase in the quality of output; a change in the structure and volume of commodity output; shifts in the location of productive forces; an improvement in the supply of materials and processing equipment; changes in the level of wholesale prices and average wages, etc.

The degree of influence that these factors have on the costs is decided either by calculating the absolute volume of savings which it is intended to achieve as a result of implementing major measures to improve the technique and organisation of production and planned structural shifts or by estimating changes in the coefficients of direct costs for each economic component per rouble of commodity output.

A second approach has to be adopted at the preliminary stage of planning work. Since, in this instance, there are immense difficulties connected with assessing the effect of all the factors, and in some cases it is simply impossible to do so, a start has to be made by selecting the most important of them that can be relatively accurately validated and calculated. For example, in the mining industry such factors may include changes in the techniques and technology of mining coal (open-pit or underground); the degree of concentration of production at individual pits and faces, the capacity of working seams and the depth of shafts; and the correlation between the growth of labour productivity and wages.

Next the quantitative relationship between changes in these factors and the trend of direct-cost coefficients is determined. If it turns out that there are as yet no planning

data available, current-progress data can be used. In this case the relationship is established by means of correlation methods, the construction of empirical functions, nomograms and other such methods and after any necessary adjustment it is extrapolated over the planned period.

Experience has shown that the application of the latest achievements of scientific and technological progress to production and rational changes in the input-output structure of raw materials and fuel and power have the greatest effect in cutting material costs. Fuel consumption per kWh of electricity can be reduced by putting more productive and economical equipment into operation. Technological progress in the iron and steel industry is accompanied by a lowering of fuel and raw-material cost ratios in the production of iron, steel and rolled products. Improvements in the quality of metal lead to a reduction in the amount of it required in the production of machinery. It should, however, be realised that any changes in the range of output or improvement in its quality sometimes demand an increase in unit inputs of raw materials and auxiliary materials.

Changes in standard depreciation allowances and the results of analysing the trend in capital-intensity during the planned period are taken into account in determining the trend of depreciation costs.

Calculations of wage expenditure are also based on a special analysis and validation of productivity growth rates and the average wage index. Productivity growth rates surpassing average wage increases are an important condition for a general reduction in production costs. This is most evident in sectors characterised by high rates of technological progress and productivity growth: the instrument-making industry, different branches of engineering, and the chemical and the gas industries.

One method of carrying out aggregate cost calculations for particular sectors makes use of information drawn from the planning input-output table in value terms.

One of the sets of equations in the input-output table describes the absolute level of current costs and net income in a particular sector:

$$x_j = \sum_i a_{ij}x_j + \sum_i b_{ij}x_j + W_j + R_j + N_j \quad (i, j = 1, 2, \dots, n),$$

where x_j —volume of output in the j th sector, 1,000 roubles;
 a_{ij} —technological coefficients of direct costs for the i th product per 1,000 roubles of output in the j th sector;
 b_{ij} —coefficients of depreciation;
 W_j, R_j, N_j —respectively, wages, net income excluding turnover tax, and turnover tax in sector j ;
 n —number of sectors.

The technological coefficients of direct costs (a_{ij}) represent nothing other than the aggregate sectoral average standard consumption of raw and other materials, semi-finished products, fuel, power, transport and communications facilities, and material and technical supplies per 1,000 roubles of output in some or other sector.

The coefficients of depreciation (b_{ij}) describe in money terms the amount of depreciation allowances per 1,000 roubles of output produced; $\frac{W_j}{x_j}$ is the unit wage costs respectively.

Other money costs in the input-output table are incorporated in the technological coefficients of direct costs, depreciation costs and part of net output.

To sum up, three economic components reflecting the transferred value of past labour (raw and other materials, depreciation) as well as part of newly-created value (wages) characterise production costs broken down into net sectors of the economy including non-industrial sectors. Thus, in the course of planning an input-output table the level and structure of costs for each economic component can be determined in the early stages of drawing up a plan.

Cost Planning During the Compilation of a Five-Year Plan

Conditions are favourable at this stage for revising planned cost indicators with the help of improved methods for calculating the effect of technical and economic factors on the level of costs. The raw data may be taken from the following planning calculations:

the production of output in physical and money terms and the technical and economic figures backing up this section of the plan;

the table showing fixed assets and production capacities;

the economic efficiency arising from the application of new equipment, advanced technology and automated control systems;

average-group standard consumption rates for raw and other materials, fuel and power;

the efficiency of increased specialisation;

the efficiency of measures for raising the quality of output;

the growth of productivity;

the increase in average wages—and other data compiled in the course of preparing the draft plan.

Serious efforts should be made to produce firm figures quantifying the economic benefits that should be obtained as a result of implementing all major measures for improving the techniques and organisation of production. This applies in full to the need for back-up figures regarding the use of credit and production development funds which serve as a source for additional investment in the modernisation or expansion of existing capacities. The savings indicated in presenting the case for each major measure of this kind should be included in the planning cost calculations.

In practice costs per rouble of output are calculated in the following way:

a) the relative coefficient of costs per rouble of output in the base year is determined and analysed;

b) the volume of output in the planned year is multiplied by the resulting coefficient. In this way the absolute level of costs for the planned period is determined on the basis of conditions and standards, relevant to the base year;

c) the savings in current costs during the planned period under the impact of a whole set of technical and economic factors are calculated;

d) total savings estimated for each of the factors (point "c") are deducted from the cost of commodity output in the planned year (point "b"). In this way the cost of output is determined on the basis of the planned year conditions and quotas;

e) by dividing total planned costs by the corresponding volume of commodity output, a new cost indicator per rouble of commodity output in the planned period is fixed,

Up until now cost calculations have been made in constant base-year prices when compiling five-year plans. This practice may be changed, once a system of long-range wholesale prices has been worked out.

Cost Planning in Annual Plans

Calculations and cost indicators are given in the greatest amount of actual detail in annual plans. In current planning, cost is calculated in planned year prices. In this way the development of the monetary and financial system is more closely coordinated with all other sections of the plan.

A special feature of determining cost in annual plans consists in taking account of the real savings that will be achieved from the moment that the new techniques or technology are applied until the end of the planned year. Any remaining savings are included in the following year's plan. Similar calculations regarding changes in production costs in a sector should be carried out whenever substantial shifts occur in the structure of the raw material being consumed (for example, when using potatoes, grain or synthetic products in the production of spirits) and fuel being used (when a power station changes over from coal to gas).

In sectors experiencing high growth rates in particular industries and a rapid renewal of output, it is important to take account of the trend in the general level of costs connected with structural changes in commodity output. Changes in cost as a result of structural shifts (U_c) are calculated according to the following formula:

$$U_c = \left(\frac{\sum_i C_i^0 q_i^0}{100} - \frac{\sum_i C_i^1 q_i^1}{100} \right) O_p^1 \quad (i = 1, 2, \dots, n),$$

where C_i^0 —costs per rouble of commodity output in the base year in the i th industry;

q_i^0, q_i^1 —the share of the i th industry (product group) in total output in the base and planned periods respectively (in percentages);

n —number of industries (product groups) determining the structure of output produced;

O_p^1 —volume of commodity output in the planned year.

The calculation of changes in quality presents a complex methodological problem in determining costs. Usually if the consumer attributes of a particular commodity are improved, additional costs are involved. They should be equal to the benefit which the consumer obtains from the improvement in quality. This benefit to the consumer is examined in macro-economic calculations in keeping with the methodology for determining the efficiency of new equipment. Additional costs (ΔC_K) entailed in producing better-quality output are fixed in accordance with the formula:

$$\Delta C_K = (C_0 - C_1) O_p,$$

where O_p —commodity output in base prices;

C_0, C_1 —cost per rouble of commodity output of previous and improved quality.

A set of additional payments (surcharges) to be applied to wholesale prices has been established for improved quality. The volume of sales should therefore increase which would in turn improve the coefficient of costs per rouble of commodity output sold at the new prices.

In those cases when the starting-up of new enterprises or the closing-down of inefficient lines of production has a considerable effect on changes in the average level of costs in a sector, this factor should be taken into account in planning cost calculations for the relevant year. The absolute change in costs due to this factor is determined by multiplying the corresponding difference in costs per rouble by the volume of commodity output produced at the new enterprise:

$$\Delta C = \frac{(C_0 - C_1)}{100} O_p^1,$$

where ΔC —change in cost of total commodity output at the old and the new enterprise;

C_0, C_1 —cost in kopecks per rouble of commodity output;

O_p^1 —volume of commodity output at the new enterprise.

In order to coordinate all changes in production costs during the planned period, a summary table is compiled which quantifies the effect of various factors on the level of costs. Special attention is paid to assessing all possible reserves for economies and avoiding any double-counting.

Cost Estimates

One method of calculating production costs when drawing up annual plans is based on the compilation of cost estimates for each of the economic components in absolute terms by ministry, production association, and enterprise. These estimates represent the total amount and structure of expenditures connected with the production and sale of output normally excluding internal transactions. They also exclude any double-counting of output by ancillary workshops or services used inside the enterprise for industrial production purposes.

Estimates must be compiled so as to be able to determine the overall requirements of enterprises coming under a particular ministry or belonging to some production association as regards wages and material and financial resources and to coordinate the production plan with financial indicators and with the plan for the supply of materials and manufacturing equipment.

Estimates are made for the following components:

a) raw and basic materials (minus recycled waste), purchased products and semi-finished products supplied by cooperative enterprises. The cost of the raw and basic materials is made up of expenditure on their acquisition and their delivery to enterprise warehouses. Expenditures arising from handling goods and delivering them by enterprises' own transport are distributed among the various components: wages, materials, fuel, etc.;

b) auxiliary materials which include the cost of bought-in materials in this category, spare parts used for maintenance repairs, and the total cost of replacement of worn-out tools, dies, etc., originally acquired from outside;

c) fuel and power supplied from outside the enterprise. This includes expenditure on acquiring fuel and power of all kinds from outside the enterprise consumed for industrial production purposes;

d) basic and supplementary wages, and social insurance contributions, fixed under the employment plan. They include the total wage bill for industrial production workers and non-establishment workers engaged in basic operations;

e) depreciation of fixed production assets earmarked in the light of the planned average annual cost of an enterprise's fixed production assets and standard depreciation allowances;

f) other money expenditures which by their nature cannot be directly referred to any of the above components: cost of services provided by outside organisations, expenses on business travel, etc.

Production cost estimates also include expenditure on operations and services unconnected with production. In order to arrive at a true estimate of cost, such estimates should be reduced by the amount of this expenditure: in particular changes in the cost of work-in-progress should be added (in the case of decreases) or deducted (in the case of increases). As a result the prime cost of output is obtained.

Total output costs will be determined if non-production costs are added on to prime cost. This estimate is done separately and depends on the volume of output sold.

In order to calculate the cost of output sold, the cost of stocks of finished goods held at the beginning of the year should be added to the corresponding indicator for the whole of output and the costs of producing any goods remaining at the end of the year should be deducted.

Computing the Costs of Particular Types of Output

A number of ministries undertake planning computations for particular types of goods. This is especially important in those sectors dominated by the production or extraction of one or two basic types of output (electricity, coal, oil, cement, sugar, spirit distilling industries, etc.). These computations can be used to revise financial indicators in annual plans and to produce detailed calculations of economic efficiency. They are absolutely essential in the case of planned price formation including the setting of wholesale prices for the most important kinds of output in the long-term period ahead. Finally, planning computations for different types of output form the basis for the current planning of enterprise production costs.

The formula for computing the cost of a unit of the j th item (C_j) can be presented in the following manner:

$$C_j = \sum_i a_{ij}P_i + \sum_i b_{ij} + \sum_k l_{kj}W_k + S_j + P_j + E_j,$$

where a_{ij} —relative expenditure of the i th type of raw and other materials, fuel and power in physical quantities on the production of a item of the j th type;

P_i —average price per unit of raw material, fuel and power;

b_{ij} —depreciation of fixed production assets of the i th type directly employed in production of the j th item;

l_{kj} —expenditure of labour by workers of a given (k th) level of skill in number of hours;

W_k —average hourly wage of workers with this level of skill and associated social insurance contributions;

S_j, P_j, E_j —the share of shop, plant and extra-production expenditures relative to the computation of the j th item.

As this formula indicates, well-founded standards regarding direct inputs of raw and other materials estimated at scheduled prices, standard labour-intensity ratios for a good and fixed wages, and standard depreciation allowances should all underpin this computation of planned cost. It is also important to apportion shop, plant, and extra-production expenditures correctly among the different types of output.

Expenditures immediately connected with the manufacture of a given output are included in the item "Raw and other materials". In this case the standard amounts of consumption of raw materials in physical quantities (a_{ij}) are multiplied by the appropriate wholesale prices (P_i) including costs arising from handling operations and delivery.

Savings of raw and other materials ($Sv_{r, m}$) will be made if standard unit consumption amounts are reduced, cheaper substitutes are used, and average prices lowered. They are calculated according to the formula:

for a particular type of goods

$$Sv_{r, m} = \sum_i a_{ij}^0 P_i^0 - \sum_i a_{ij}^1 P_i^1;$$

for the total output of a particular type of goods

$$Sv_{r,m} = \left(\sum_i a_{ij}^0 P_i^0 - \sum_i a_{ij}^1 P_i^1 \right) x_j,$$

where a_{ij}^0 , a_{ij}^1 —standard inputs of the i th type of raw or other material, fuel for manufacturing the j th product in the base and the planned periods respectively;

P_i^0 , P_i^1 —average price of a unit of the i th type of material inputs (subjects of labour) in the period;

x_j —volume of production of the j th item in the planned period.

If measures aimed at reducing standard expenditures or average wholesale prices are not undertaken from the beginning of the planned period, then the actual saving rather than the average annual saving is calculated from the moment such measures are carried out until the end of the year.

Expenditure on fuel and power for technological purposes and depreciation in those instances when it is singled out as a separate item are planned in the same way.

Expenditures coming under the headings "Basic and supplementary wages of production workers" and "Social insurance contributions from production workers' wages" are calculated in the light of standard earnings and wage rates for the appropriate skill category. Supplementary wages are also included in the item, namely: annual and additional holiday pay, pay for holidays not taken, compensatory pay for shorter hours worked by juveniles and pay to cover time-off for nursing mothers.

Total wages paid to ancillary workers employed in general operations are entered under "Other shop expenditures".

The most difficult problems in computing the cost of a unit of a commodity arise in connection with planning complex expenditures connected with the technical servicing needs of production and management, since they cannot always be directly related to the cost of a particular type of output. They include expenditures on the upkeep and operation of equipment, shop and plant expenditures, and extra-production (commercial) costs.

Complex expenditures are established by compiling estimates for the various production sections and sites, which

can then be used to establish where resources have been spent. Estimates of this kind are drawn up on the basis of progressive standards and limits, and of staff schedules fixed for the different sections, shops, and sites.

The estimates of complex expenditures that are obtained in a number of sectors are distributed among the different types of output in proportion to the direct wages of the skilled workers. This method widely used in the past can still be used today in production in which manual labour is predominant.

In modern mechanised and even more so in automated shops and sections, however, this would lead to distortions in cost calculations. In these conditions the greater part of shop expenditures (depreciation, expenditure on electricity, steampower, repairs, technical servicing, etc.) should be planned on the basis of standards linked to the operating of basic technological equipment. In order to be able to do this, calculations are made of standard summary costs for the upkeep, current maintenance and operation of various types or groups of equipment by section and shop per machine-hour, and then these expenditures are apportioned to the different types of output depending on the amount of machine-time required for manufacturing goods in a particular shop.

Expenditure on the upkeep, current maintenance and depreciation of production buildings and installations is best apportioned to the cost of a machine-hour of unit space occupied by the technological equipment.

Expenditure on transport inside a shop should be apportioned to the cost of the different types of output in accordance with their share in the overall volume of goods handled, measured in tons, ton-kilometres, etc.

Among the remaining shop expenditures the main share is taken up by expenditure on the wages of engineering and technical staff, ancillary and administrative workers and on social insurance contributions, as well as expenditures on research, rationalisation schemes and inventions, on safety at work, etc. These costs can be distributed among the computations for different goods in accordance with two principles: either in proportion to the number of machine-hours attributable to a particular production item; or depending

on the volume of the basic wage (especially in shops where the relative number of ancillary workers is high).

Plant and extra-production expenditures should be distributed among computations for different types of goods on the basis of the same principle as in the case of shop expenditures.

A comparatively new method of determining average sectoral costs is one based on a study of the stable relationships that exist between a change in certain technical-economic indicators (parameters) on the one hand, and expenditures on the production of goods found in parametric series, on the other. Transformers placed in order of increasing capacity, electric cables classed according to a change in their diameter or cranes according to their lifting capacity and many other machines provide examples of such series.

This method takes account of the fact that the same principles are applied in designing machinery and equipment belonging to the same parametric series. Because of this, consistent changes made in the various technical, physical, and chemical parameters of homogeneous goods give rise to strictly regular changes in the level of their production costs. A fully determined cost-value corresponds to each value of the technical parameter. This enables one to assert that such variables have a functional relationship

$$C_j = f(x, y, z),$$

where C_j —level of costs of the j th model in a series of homogeneous goods;

x, y, z —different technical parameters acting as initial independent variables (argument of the function).

The problem is therefore to establish by means of analysis the trend of the level of costs as a function of changes in the different parameters. Correlation analysis, and the method of constructing empirical functions and nomograms by means of which this regularity can be determined fairly easily and sufficiently accurately are used in solving this problem.*

* See Koshuta A. A., *Price Determination for Engineering Output*, Moscow, 1964, p. 49 (in Russian); *Calculating the Consumer Properties of Output in Price Formation*, Moscow, 1964, p. 180 (in Russian).

The methodology for planning the cost of output and services in other sectors is based on the same principles as the planning of production costs in industry. It does, however, possess a number of special features due to the specific nature of the economic activity, the methodology of calculation and the planning of different sectors.

The Special Features of Planning Cost in Non-Industrial Sectors

In order to provide an economic validation of profit and other financial indicators and evaluate the economic efficiency of different variants of development in *agriculture*, the central authorities determine costs per rouble of gross output (for exchange), standard expenditures per hectare of sown area and per head of cattle, and the cost of the most important types of output for the whole of the planned period. There are two possible methods of calculation. The first method consists in working out aggregate coefficients for expenditures on pay and on feedstuffs, seed, fertilisers, fuel and lubricants, and on current maintenance and the depreciation of fixed assets. It is similar to the index method of calculating the coefficients for expenditures per rouble of output explained above. The second method envisages the computation of all elements of cost in the light of long-range data about the development of production and technological improvements with due regard for the special features of particular natural and economic zones.

It is advisable to employ the first method at the preliminary stages since it helps save time though the data obtained should be regarded as approximate. The second method is more labour-intensive but provides more reliable information about the trend of costs in agricultural output in the long term.

In the course of compiling annual plans on state and collective farms, production cost estimates are drawn up and the cost of different types of agricultural output is computed.

The general level of costs (cost estimate) is also calculated for the various types of operations including direct and overhead expenditures. Seed (in crop farming) and feedstuffs

(in livestock farming) constitute a large proportion of these. Transport costs are also relatively high and have in a number of cases to be entered on a special row.

Among the technical-economic factors considered in planning calculations of the cost of agricultural output at the sectoral level, the following should be singled out:

- a) complex mechanisation and electrification of production;
- b) the use of mineral fertilisers and chemical pesticides, etc.;
- c) rational specialisation and intensification in crop and livestock farming;
- d) the creation of an effective structure of sown areas and crop rotations and herd structure;
- e) changes in wholesale prices and rates for industrial goods consumed in agriculture;
- f) the mobilisation of internal production reserves for lowering costs: improved use of equipment and circulating assets (seed, feedstuffs, fuel, etc.), improvements in the organisation of labour and economic management and other measures directed at raising production efficiency.

The special feature of planning calculations of the cost of a unit of agricultural output consists in the fact that first of all costs per hectare or for the upkeep of a commercial herd have to be determined. Thus the cost of a centner of grain, potatoes, beet and other crops is calculated by dividing total costs (planned for the entire area to be sown or per hectare) by the projected outcome of gross physical output or, respectively, by yield per hectare. The weight of grain after processing is used in calculating the yield and gross output of grain crops.

The cost of a centner of milk is calculated by dividing costs incurred in the upkeep of cows and stud bulls (less the cost of any by-product) by total milk yield plus the annual addition of calves. One calf is taken to be equivalent to one centner of milk. The cost of one centner of additional weight of a young animal is determined by dividing upkeep costs (excluding the cost of any by-products) by the annual addition to weight.

Two questions presently under discussion regarding fixing the cost of agricultural output may be mentioned: the method

for determining pay on collective farms and the evaluation of farms' own output (feedstuffs, seed, young cattle).

Unlike state farms where the level and total amount of wages is planned by the state authorities, collective farms determine the amount of money to be set aside for pay independently and set wages for each category of worker guided by the guaranteed minimum and the results of its production operations. The question arises in this connection at what level collective farm pay should be planned when determining the cost of agricultural output.

At the present time two methods are in practical use. In some cases actual expenditure on pay is planned and this makes it possible to organise economic accounting correctly and to plan financial indicators for the work of a collective farm. In other cases, mainly for purposes of economic analysis and comparison, the cost of collective farm output is determined with regard to the level of wages earned by state farm workers.

The second controversial question is the method for evaluating farm's own output: feedstuffs, seed, and young cattle.

It should be borne in mind that feedstuffs account for the main part of costs for meat and dairy products. Approximately 70-80 per cent of these feedstuffs are not sold and bought on the market but are used by the farms that grow them. Depending on how feedstuffs are evaluated, the cost of livestock varies considerably. Some economists favour evaluating feedstuffs at purchase prices, others—at cost.

The following procedures have been adopted in planning practice:

Feedstuffs and seed harvested and used on the farm that same year are evaluated at planned cost including expenditures on transport and processing. Stocks of these products and also any young cattle held over till the following year are evaluated at actual cost but no higher than fixed procurement prices.

In the *construction industry* planning cost calculations are based on the estimated value of particular projects. Only the cost of building and installation work rather than the total volume of capital construction is determined since the value of installed equipment does not depend on the results of building operations.

The planned cost of building and installation work is less than its estimated value by the amount of planned accumulation and savings derived from cutting costs. It includes:

1) direct costs: a) expenditure on building materials; b) workers' basic wages; c) costs of operating building machinery; d) the cost of earth-moving operations; and e) other direct expenditures;

2) overhead costs: a) administrative expenses; b) expenditure on providing services for the work force; c) expenditure on organisation and production; and d) other overhead expenses.

Direct costs connected with the immediate execution of building work and the fitting of various construction components in the project under construction are planned on the basis of individual rates for specific types of operations and centrally fixed standard estimates published in a special manual entitled *Building Standards and Rules*. The majority of these standards are given in physical units (apart from the indicators for pay and certain other items whose relative importance in the total figure is insignificant). To determine the cost of building and installation work, standard unit expenditures in physical terms are multiplied by average estimated prices for basic materials and building structures and by individual rates of machine shifts for the most important types of equipment. By far the greater part of building materials are obtained or produced within their zone of use. For this reason estimated prices are differentiated by region and area.

The cost of moving earth and delivering materials, finished parts and structures from the stores to the site are also included in direct costs.

Overhead costs are calculated either in accordance with established standards as a certain percentage of direct costs (basic wages) or, if no such standards have been fixed, on the basis of individual estimates.

In the field of *transport* (rail, sea, road, air and pipeline), the cost of 10 calculated ton-kilometres (miles) and passenger-kilometres is subject to planning as is the size of cost reductions per unit of transport operation. Recently wider use has been made of methods of computing the cost of ope-

rating a unit of equipment (locomotive, wagon, plane, car).

The special feature of planning transport costs lies in the fact that the level of costs fluctuates considerably depending on the type of freight and the distance. Thus, for example, when transporting coal the carrying capacity of a wagon is fully utilised, but when moving timber it is only half used. Bulk freight is transported by mainline goods trains, while other goods may be sent off in small consignments. Some goods can be stored in the open air, while others need to be kept in covered warehouses. The entire process of transporting freight from the point of departure to its destination can be divided schematically into three stages: the initial operation, the movement of the freight, the final operation (marshalling the freight cars, shunting them ready for unloading, unloading, cleaning out the cars, etc.) All costs incurred in the initial and final stages are taken to be constant, for they do not depend on the length of the journey. However costs connected with moving the goods constitute the major part of transport costs. Therefore the greater the distance the lower the transport costs, as a rule, per ton-kilometre.

All these factors have to be taken into account in planning transport costs.

Planning calculations of *commercial circulation costs* are done both in absolute figures and as percentages of trade turnover. In retail trade they include all expenditures connected with the delivery, storage, packaging and sale of goods. The production and circulation costs of public catering establishments include expenditures on delivering the raw materials, on food preparation and on selling their own products as well as bought-in goods.

The main items of expenditure in retail trade and at public catering establishments are payments for the services of transport organisations, wages (basic and supplementary), rent, depreciation of fixed assets, operating expenses including payment for electricity, steam power, and fuel.

The following technical-economic factors have a considerable effect in changing circulation costs: a) the introduction of new technology in trading and public catering establishments; b) the rationalisation of goods deliveries; c) the introduction of progressive forms of trading; d) changes in the structure of trade; e) the implementation of measures

for improving the standard of service to the general public.

At the present time qualitative improvements are being made in the organisation of the service sector, including retail trade and public catering in view of the sharply rising needs of the Soviet public. This will obviously be accompanied for a certain period of time by a stabilisation or even a certain increase in circulation costs.

2. PRICE PLANNING

The implementation of the economic reform entailed a serious reorganisation of the system of planned price formation along the following main lines:

strengthening of prices as incentives in developing technological progress and raising the efficiency of social production;

successive approximation of price levels to socially necessary labour costs;

establishment of a much closer connection between the practice of price formation and the aims and tasks of macro-economic planning.

Depending on their particular function planned prices are divided into wholesale prices at which output in the state sector is traded; purchase (delivery) prices for agricultural produce sold as part of the plan by collective (state) farms; and retail prices at which consumer goods are sold to the public by state and cooperative trading outlets.

Table 19

**Purchase, Wholesale and Retail Price
Indices in the Soviet Economy (1940 = 100)**

	1950	1960	1965	1970	1972
Purchase prices for agricultural produce	188	558	777	970	970
Industrial whole- sale prices (incl. turnover tax)	170	129	127	136	133
Retail prices . . .	186	139	140	139	139

As these figures show, by the beginning of the 1950s it proved possible to stop the rise in wholesale and retail prices which occurred during the Second World War. In the subsequent period wholesale and retail prices dropped considerably and then became stable. Purchase prices for agricultural produce have increased considerably in recent years reflecting the immense amount of financial assistance given to the peasantry by the socialist state.

It is best to take wholesale prices which form the main link in the entire system of planned price formation as an example in examining methodological questions of planning prices. Two types of price have been fixed for industrial output. 1. The enterprise wholesale price at which output is released to selling organisations; it includes planned cost (of wages and producer goods) and a standard rate of profit. The volume of output sold and financial and other indicators in the enterprise plan are calculated at these prices. 2. Industry wholesale price which exceeds the enterprise wholesale price by the amount of the mark-up added by selling organisations. In some branches of production it also includes the turnover tax. It should be noted that for most producer goods only enterprise wholesale prices are laid down with a fixed commission (surcharge) to cover the costs of selling organisations.

In order to calculate the wholesale price of any type of goods correctly, its planned cost must be computed and the size of net income must be validated in economic terms. In doing this, account must be taken of the price level of a particular type of goods, its production profitability and the relationship with prices for substitute or similar goods.

Three different types of operations each with its own particular features are involved in planning wholesale prices: a) current regulation of the existing system of planned price formation, i.e. fixing prices for new or improved goods and operational changes in the price levels and profitability of established types of output; b) general revisions of wholesale prices for the output of the whole of industry or certain sectors, i.e., rearrangement of the actual system of planned prices; c) the drawing up of long-range wholesale prices.

Current Price Regulation

The main tasks that have to be tackled in current price regulation are to find a valid basis for a rate of profit that acts as an incentive to producers to make the whole range of output foreseen in the plan and to establish a price relationship for substitute goods that stimulates an improvement in quality and the rapid application of modern scientific and technological achievements and helps to make optimal use of goods in short supply.

The setting of wholesale prices begins with the determination of minimum and maximum limits.

The lower limit for new or improved goods is set with reference to the interests of a normally functioning production unit producing a basic line of goods. Experience shows that there is a tendency for costs connected with the research and design of new types of output to rise rapidly. Moreover, in the first one or two years of production, costs increase substantially (by 15-20 per cent and more). These additional costs are financed from a special fund for mastering new technology. Thus the lower limit of the wholesale price for new goods is usually determined on the basis of planned costs in the second year of mass production and average profitability achieved in the production of other goods. In this way enterprises are placed on an equal economic footing as regards the output of old and new types of output.

The problem is complicated by the fact that the price should stimulate not only production but also the application of new technology in the economy and should act as an incentive to the producing unit in making use of it. In this connection the planning bodies determine another objective limit in the field of price formation policy—the upper limit of wholesale prices.

The upper limit is fixed by determining the economic efficiency of the new or improved goods in comparison with the existing ones. The upper limit for the wholesale price of a substitute commodity (P_c) can be determined as follows:

$$P_c = \alpha P_0 + S$$

where P_0 —price of the base good;

α —physical coefficient of substitutability: ratio of machine capacity or standard expenditure of material inputs (subjects of labour);

S —savings made by the producing unit on current and capital inputs arising from the technological use of the substitute commodity.

The price limit describes the level of the monetary estimate of the use properties of the substitute goods at which it is a matter of indifference to the consuming enterprise whether it uses the traditional or the new, improved article.

The planned wholesale price for new output (P_{pl}) is fixed between the upper and lower limits in such a way as to create favourable conditions (increased profitability) for its production and application throughout the economy in accordance with the following formula:

$$P_{pl} = P_a + r(P_n - P_a),$$

where r —coefficient determining the relative distribution of economic benefits from the new output between producer and consumer.

Planned wholesale prices for new output are introduced either without any time limit on them (constant price) or with some indication as to the length of time they should last.

The central authorities approve these coefficients, the standard labour-intensity and other costs depending on the complexity group of the model in question. They also lay down the standard rate of profit.

The approved wholesale prices are published in special handbooks—in scheduled price lists which give the name of the article, its basic quality parameters, the State Standard or Technical Specification, the wholesale price level, the amount of discount (surcharge) with an indication of when it can be applied, and conditions of delivery.

Most types of industrial materials, fuel, semi-finished goods and equipment are supplied to consumers at uniform state wholesale prices which helps to ensure correct planning and proper consideration for economic and financial indicators throughout the economy. Uniform prices differentiated by zone (oil products, timber, consumer goods) and by mining or extraction area (coal, iron ore, peat) are fixed from

the output of various sectors in which transport costs form a large proportion of the total.

Certain differences arise in connection with different practices regarding reimbursement of transport expenditures in the prices. In some cases freight tariffs are paid by the producer in which case the price is fixed free-station (port) of arrival or even free-customer's warehouse. This type of price is convenient to the consuming enterprise since its qualitative plan indicators do not change depending on which supplier it is linked to in the system of material and technical supplies. In the course of the planned period, suppliers are sometimes changed several times over. Prices fixed free-station of arrival are laid down for ferrous metals, oil products, timber, cement and the majority of consumer goods (fabrics, footwear, clothing, domestic and cultural goods, etc.).

In certain other instances transport costs are paid by the customer. The price is laid down free-station of departure or free-supplier (prices for coal, chemicals, machinery and equipment, and for certain consumer goods). In the case of free-station of departure prices, the consumer bears varying costs depending on where he acquires the goods he needs. Prices are used in this way as an incentive to establish the best kind of economic ties between suppliers and consumers and to effect a rational location of production.

General or Partial Revision of Wholesale Prices

When the need arises to make qualitative changes in the whole system of prices in connection with the development of marked discrepancies between existing prices in the new economic conditions of industry and marketing, a general or partial review of wholesale prices is undertaken.

At the initial stage the general principles and basic directions for improving wholesale prices are decided on and aggregate calculations are made of the index showing the change-over to the new prices in an economic-mathematical model of a planning input-output table.

In the course of this general revision of wholesale prices the country's entire financial system must be properly ba-

lanced. It is therefore necessary to determine the quantitative linkages in the production and distribution of the surplus product in monetary form. To this end a summary input-output table of financial resources in existing and new prices has to be compiled. It reflects the proportions between the sources of net income in the economy, on the one hand, and their main end-uses, on the other.

An important feature of the general revision is that it usually gives rise to improvements in planned price formation. Expenditures included in the computation of costs are made more specific and the bases and standards for fixing profitability are revised. Thus, whereas previously profit was included in wholesale prices as a definite percentage of cost, this principle has had to be changed after the economic reform has been implemented.

The decisions taken at the September 1965 Plenary Meeting of the Soviet Communist Party's Central Committee regarding the procedures for allocating profit and regarding the setting up of incentive funds at enterprises in relation to the degree of profitability calculated as a percentage of fixed production assets very largely predetermine the initial formula for wholesale price. A normally functioning enterprise should cover its costs, make a payment into the budget for its production assets, and have enough funds left over for its own development and to provide economic incentives for its production work force out of its income from sales. In the light of these requirements the wholesale price formula takes the following form:

$$P = M + \alpha_w \cdot W + \beta_k \cdot K + N,$$

where M —production cost of a particular good (excluding social insurance contributions);

α_w —coefficient for social insurance contributions;

W —wage costs;

K —amount of production assets employed;

β_k —coefficient of profitability as a percentage of production assets;

N —differential income and turnover tax included in wholesale price (in a number of sectors $N = 0$).

The economic sense of such a model lies in the fact that net income is formulated in wholesale price with due regard

for the labour intensity of production, its capital intensity and natural conditions.

However, there is also a reverse link. Part of net income is paid into the state budget at a certain standard rate depending on the amount of wages (including social insurance contributions), on the volume of production assets (payment for assets), and on the natural factor (rental payments). The wholesale price model is thus closely linked with the system of material incentives for making better use of living and past labour and of favourable natural conditions.

Once the government has approved the main directions and initial principles underpinning the general revision of wholesale prices, work is begun on new price lists for specific types of output. First of all the range of products for which new wholesale prices will be fixed is determined, taking into account new trends in technological progress and the economic efficiency of substitute goods. As a rule, new standards and technical specifications are drawn up: the range of products included in the price lists is substantially renewed, especially in engineering.

In determining the level of new wholesale prices, planned cost computations are used as the initial base. Since cost is itself a monetary category, its projected level should be established with regard to price increases or cuts caused by changes in the wholesale price of raw and other materials, fuel, electricity and freight rates. Price increases or cuts are usually determined by recalculating all materials listed in the specifications at the new prices; if the prices for a whole group of material inputs show an even change, this should be done by means of aggregate coefficients.

Before the wholesale prices are finally put into effect, the plan indicators are recalculated at the new prices, the counteracting effect of price increases and cuts are finally specified, all the consequences of introducing the new prices are ascertained and the appropriate corrections are made in the financial indicators.

In the Ninth Five-Year Plan a review was carried out of wholesale prices for engineering products with a view to reducing them substantially. Prices for the output of other branches of industry have been improved. Their role in

stimulating technological progress and improving the quality of output has been considerably increased.

General and partial price revisions entail extremely complex, labour-intensive and expensive measures. They also take several years to prepare. For this reason new prices set up by using a certain body of information do not always correspond to the actual conditions of production and sale. In this connection a number of problems which were previously solved by means of general price revisions are now decided in the course of current price regulation and when planning long-range prices.

Setting Long-Range Wholesale Prices

So that the operational regulation of existing prices should take a uniform direction and maintain a close connection with the basic trends of economic development in the future, long-range prices are worked out at the same time as the five-year plans are drawn up. The system of long-range prices helps to improve the validity of all economic levers and the summary indicators used in macro-economic planning and projections. The level of these prices is given by the indices showing the trend of the monetary form of output value in different sectors of the economy in comparison with the base period and by the absolute value of prices for the most important types of output of most interest to planning bodies and organisations.

First of all the aggregate indices for different sectors are calculated. If use is made of a planning input-output model in base prices and consequently of a set of interconnected coefficients of material inputs for the j th type of output (a_{ij}), depreciation (b_{ij}), capital intensity (f_{ij}), plus total wages W_j and social insurance contributions S_j , and if the β coefficient is determined from the known volume of profit in new prices, the level of long-range prices can be found once their indices as compared to existing prices have been calculated on a computer according to the formula:

$$P_j = \sum_{i=1}^n P_i (a_{ij} + b_{ij} + \beta f_{ij}) + \frac{W_j + S_j + N_j}{X^0} \quad (j = 1, 2, \dots, n),$$

where P_j —new price indices;

x_j^0 —volume of production in the j th sector in base prices;

N_j —rental payments (turnover tax) included in wholesale prices.

Since the number of unknowns P_i and the number of equations are equal, the system has a solution and, moreover, a unique one.

If the level of new prices in the different sectors is calculated, a general idea is gained of the new price system and its general level taking into account the counteracting effect of price increases and cuts. Next long-range wholesale prices for key types of output are determined on the basis of planned computations and indices showing the change-over to the new prices obtained as a result of calculations drawn from the input-output model.

Since long-range wholesale prices chiefly perform an accounting function, they should approximate to the maximum extent possible the level of socially necessary labour costs. Accordingly, in order to validate them, a numerical economic-mathematical model showing the amount of socially necessary labour costs in the production of different types of output should be constructed. In practice this problem is solved by calculating the full labour intensity of a rouble of output in a sector or of a particular article. These kinds of indicators show the amount of labour time which society spends at all stages of manufacturing a particular type of output starting from extraction of the raw material and finishing with its sale. The value of the production assets employed can also be expressed in labour time; this means that a model can be constructed that shows not only full current but also calculated labour costs.

Data regarding the labour intensity of output, i.e. direct inputs of living labour serve as initial information for all these calculations. Data concerning full labour intensity reflecting the amount of full current or calculated inputs of labour time open up additional opportunities for analysis and validation of the need to change long-range prices.

Price Planning in Non-Industrial Sectors

Production and trade in non-industrial sectors display a number of special features of both technological and social nature which condition the specific character of price planning of their output. This is the case above all in agriculture where a considerable part of output is produced by the co-operative-collective farm sector.

The economic relationship between the working class and the peasantry is reflected in the problem of purchase prices. It should be pointed out in this connection that both collective and state farms have received a tremendous amount of financial help from the state in recent years as a result of the radical reorganisation of the purchase price system which has begun to reflect sectoral and zonal production costs more fully. The levels of purchase and delivery prices for similar products have drawn closer together while the incentive role of prices in increasing agricultural production and improving the quality of output has been strengthened.

Socially necessary labour costs calculated with regard to the trends in crop yields and in livestock productivity over a number of years in different zones of the country and their likely change in the long-range period ahead form the basis for planning state purchase prices.

Purchase prices for agricultural produce should be sufficient to ensure accumulation needed for extended reproduction on the collective farms which do not receive investments from centralised funds.

The level of purchase prices should be high enough to cover production costs including pay, the setting up of collective farm pension, insurance and other funds, expenditure on acquiring production equipment, the construction of production structures, and expansion of the commercial livestock, always with due regard for the economic benefits to be derived from these measures. Part of the surplus product created on collective farms is redistributed through the price mechanism to the state to help financing the social consumption and accumulation funds.

The amount of net income that goes to paying income tax is fixed at rates laid down in the form of directives, while the size of pension funds and funds set up to provide cultural

and social amenities is set as a percentage of pay in accordance with standards adopted for the planned period. The share of net income required for accumulation is determined on the basis of a combination of three indicators—planned rates of production growth, length of time before withdrawal of production assets and trends in the returns-on-assets ratio.

In planning the level of purchase (delivery) prices, account should be taken not only of the level of profitability in relation to costs per unit of output but of total profit from each hectare of agricultural land, as well so as not to allow different levels of profitability for different types of output from the point of view of the collective farm's overall production possibilities. This is an important feature of price formation in agriculture. Underestimation of such a factor as land use has led in the past to lower production of cereal and certain other valuable crops.

Another important distinguishing feature of purchase (delivery) prices is that they take into account the effect of natural conditions, the quality of land, the geographical siting of an enterprise, and weather conditions on costs of agricultural output. Consequently in planning purchase prices it is important to produce an economic validation of their level and zonal and seasonal differentiation and of the relationship between prices for different types of output. Purchase prices should act as an incentive to the rational location and specialisation of production and an improvement in quality. The upper price limit is determined on the basis of the individual costs incurred by the group of collective farms which are situated in relatively bad conditions and are drawn into the production of certain products according to the plan. Such prices should not however exceed the retail price level.

Much greater differentiation of purchase prices for the different republics and zones has been carried out in accordance with the decisions of the March 1965 Plenary Meeting of the Soviet Communist Party's Central Committee.

Fifteen zonal price levels for grain have been established in the Russian Soviet Federative Socialist Republic. There has been greater differentiation of purchase prices in the case of sunflower seeds, sugar beet and other products which

has made it possible to express socially necessary production costs more fully in the prices charged. At the same time the price relationships should not correspond entirely to fluctuations in cost. Thus, for example, grain costs in different zones fluctuate much more than the prices. This acts as a stimulus to the specialisation in production of different types of agricultural products in the most favourable natural conditions.

The Estimation of Construction Work

The output of construction operations is sold at estimated cost which represents a special kind of transfer price. The organisation that has placed the order uses this price to settle its account with the contracting organisation that undertakes to construct a project. This price has taken on a particular importance since building and installation organisations have been transferred to the new system of planning and material incentives.

The organisation that undertakes the project-planning work for a production enterprise, dwelling or public building is responsible for drawing up and validating the project estimate for the construction work. The estimated cost of capital construction includes all kinds of costs incurred in preparing the site, putting up the building and commissioning the project, and a certain amount of profit for the building organisations. Estimates of building and installation operations and the cost of equipment at wholesale prices including transport costs are taken as the basis of the calculation.

Since the project estimate for capital construction has to be worked out for practically every single structure, it is based not on social but on individual costs and this weakens the incentive effect of the law of value and of profit and loss principle on raising investment efficiency. Because of this many economists believe that a number of changes should be made in the procedures for price formation as applied to construction.

It has been suggested in particular that zonal price lists should be drawn up for different mass construction projects. In fact such prices have already been introduced in housing

construction. There are some price lists in existence in industrial and other types of construction. Standard investment ratios can be another variant: the methodology for determining these ratios taking into account the specific nature of construction in the different sectors is being jointly worked out by a large number of research organisations.

Introduction of prices on specific construction projects requires an improvement in standardisation procedures and careful validation of the profitability of carrying out different types of construction work, while a set of long-range prices for building materials and equipment must be compiled.

'Transport Rates

Passenger and freight rates for all types of transport are fixed by the state. Planning this specific type of price has a lot in common as regards methodology with the planning of prices for industrial output. Socially necessary labour costs in money terms form the basis of transport rates, which are also used as an economic lever for eliminating irrational journeys, improving the use of the rolling stocks, and making increased use of river and sea transport in the interests of raising the efficiency of social production.

Inasmuch as transport costs vary with the weight and type of freight and with distance, all these factors have to be taken into account when planning transport rates. However, in a number of cases their level differs substantially from the trend of costs so as to encourage rational routing of freight and passengers from the macro-economic point of view. Thus, transport rates are used to encourage local production with a view of cutting the long-distance transportation of fuel and other types of raw materials. In order to make better use of technical equipment, accounts are settled with the dispatcher of goods in wagon-kilometres rather than ton-kilometres, incentives are offered for sending freight along little-used routes, etc. As regards passenger traffic, concessionary fares are fixed on commuter routes around major industrial and administrative centres so as to help ensure more even employment opportunities for people

living in these areas and to help organise people's leisure time.

Prices of Consumer Goods

The characteristic feature of price formation for the majority of consumer goods is the existence of two price lists—wholesale and retail. Wholesale prices excluding turnover tax chiefly reflect the conditions of production and help to strengthen economic accounting in the light and food industries. The retail price list is orientated more towards conditions of sales and takes account of supply and demand and the price relationship between substitute and similar goods. Turnover tax is the difference between the two lists (if we exclude the trading commission).

Table 20

Scheme for a Set of Prices for Consumer Goods

	Cost	Profit	Sale mark- up (com- mis- sion)	Turn- over tax	Trad- ing com- mis- sion
Enterprise wholesale price					
Industry wholesale price					
Retail price					

State retail prices are the final prices at which goods are sold to the public. As regards their economic content and importance they are far more multi-faceted than other types of price and it is this that determines their special position in the entire system of planned price formation. Any change in retail prices makes a direct impact on personal real income which is a matter of great social and political importance.

Retail prices are an important policy instrument used by the Soviet state to ensure a steady rise in people's material well-being.

Data about the sectoral average and in some cases the regional average costs of producing and selling a certain type of goods is taken as the initial basis for establishing the level of retail prices. At the same time retail prices are used for redistributing national income among different social groups of working people resulting in the deviation of price from cost. This is done in practice by fixing a different level of profitability and by changing the amount of turnover tax which is accompanied by a relative fall or rise in the price of certain product groups. Many consumer goods (for example, articles for children, school stationery, items of personal hygiene, etc.) do not bear any turnover tax. In this way retail prices are used as a means of helping large families, of promoting education and culture, and protecting and improving people's health.

Any planned reduction in retail prices should be coordinated with changes in the table of personal income and expenditure, and with projected measures for raising wages, pensions and social consumption expenditure. Retail prices play an important part in shaping personal needs and help to balance supply and demand. Any lowering of retail prices leads to an increase in demand. For this reason it is essential to hold stocks of goods so as to be able to cut prices. In doing so account must be taken of the coefficients of elasticity, which reflect the fact that if the price of a certain type of goods is lowered, demand for it increases but not necessarily in proportion to the reduction in price, since people use some of their newly-released funds to increase their purchases of other goods, the price of which has not fallen.

If the quality of the finish improves or the reliability and durability of a good increases, additional costs are usually incurred. At the same time there is greater demand for new goods of better quality, attractive appearance, etc. In view of these factors, higher prices are usually fixed temporarily (usually for a year) for such goods, which encourages enterprises to produce new and better quality goods.

For most goods uniform retail prices are fixed for the country as a whole since this is necessary in implementing a uniform state policy in regard to pay. For certain goods in which transport costs constitute a relatively large share of total costs, retail prices are differentiated by zone. Such prices are mostly fixed for food products (meat, bread, sugar, fish and fish products, and fruit) and for non-food goods difficult to transport which are mainly produced for the local market (furniture, timber).

Trading mark-ups are designed to cover trading costs and the profits of trade organisations. They are fixed as a percentage of retail prices or as the difference between wholesale and retail prices. Different mark-ups are fixed for different goods depending on the amount of trading costs (storage, transport, packaging, etc.).

CHAPTER VIII

FINANCIAL PLANNING

1. THE FINANCIAL PLANNING SYSTEM AND ITS TASKS

Social reproduction takes both a physical and a value form. Financial resources are needed in order to produce goods, undertake capital construction and develop the non-production services. For this reason financial planning constitutes a crucial part of macro-economic planning.

The uniform system of financial plans operating in the Soviet Union comprises: a) enterprise and sectoral finance—the financial plans (income-expenditure balances) of state enterprises, construction sites, state farms, transport and economic organisations, ministries and their chief departments and associations; b) central state finance—the state budget, state life and property insurance plans, the social insurance budget; c) credit—the credit plans of the State Bank, the Foreign Trade Bank, the Construction Bank and savings banks.

The main source of finance is the income from sales of products earned by state enterprises, collective farms, and cooperative organisations. Out of this income enterprises must cover the costs of production and of replacing the means of production (raw and other industrial materials, fuel, electricity, depreciation of plant, buildings and equipment, etc.), and pay the wages of production workers and those engaged in the sale and distribution of goods.

In aggregate these expenditures constitute the production costs of state enterprises, collective farms, and cooperative organisations. Financial planning has the task of seeking out and using all possible reserves for lowering costs by

applying the achievements of science and technology to the economy, drawing up progressive unit cost rates for production, raising labour productivity, etc.

The difference between income from sales and costs represents enterprise net income or, for the economy as a whole, social net income. In industry it takes two forms—turnover tax and profit. Net income is used to expand production and satisfy the other needs of society. The task facing financial planning consists in making sure that net income increases in step with the projected increase in social needs and in making the most rational use of accumulated funds.

Part of net income is paid into the state budget in the form of turnover tax at a firmly fixed rate. The remainder which assumes the form of profit and is the difference between enterprise wholesale price and the cost of production is distributed between the state (state budget) and the enterprise. Out of these profits enterprises make a payment to the state budget for their production assets at rates that are usually fixed for a number of years; they also make fixed payments to the budget and set up their own funds (for material incentive schemes, social and cultural measures and housing construction, and the development of production). Losses incurred in the provision of housing and other social amenities are covered out of profits, which are also used to increase circulating assets and meet other enterprise expenses. The free residual profit is forwarded into the state budget.

These arrangements provide an incentive to enterprise work forces and individual workers to improve operating results and guarantee the generation of both central and local sources of finance essential for investment, social construction and the other needs apparent in society and at each individual enterprise. This distribution of funds ensures the best possible combination of the interests of society as a whole and of the individual enterprises.

The USSR State Budget comprising the national budget and the budgets of the Union republics including local budgets constitutes the plan for central finance. This is made up of the contributions from the monetary funds of state enterprises and other economic organisations mentioned above; payments made by cooperatives and collective farms;

fiscal taxes and other receipts from the personal sector, and the proceeds from loans and lotteries. National funds are used for the construction of major projects (industrial enterprises, power stations, mines, agricultural complexes, etc.) and for implementing major social, economic and other measures.

The summary financial plan—the national income-expenditure balance—holds the leading position in the whole system of financial plans, since there should be a single financial plan to correspond to the single macro-economic plan. The main task in drawing up such a balance sheet is to ensure correct proportions between the state's financial resources and its expenditures on developing the economy, improving living conditions and strengthening the country's defence capability.

2. NATIONAL INCOME AND EXPENDITURE BALANCE

The national income-expenditure balance sheet covers all sources of finance mobilised by the state in the form of the total accumulated funds of state enterprises and economic organisations (total profits and turnover tax), payments out of collective farm net income and cooperatives' profits and other receipts, and all expenditures both central and local. Thus the national income-expenditure balance is broader in scope than the state budget since the latter covers only central sources of finance.

Suggested Structure of a Financial Balance Sheet

I. Sources

1. Accumulated funds of state enterprises and other economic organisations: a) profits, b) turnover tax.
2. State social insurance funds.
3. Foreign trade receipts.
4. Depreciation payments.
5. Income tax from cooperatives and collective farms.
6. Receipts from the population: a) taxes; b) increase in savings (savings-bank deposits), etc.
7. Other receipts.
8. Total of finance sources.

II. Uses

1. Capital investment.
2. Geological survey work.
3. Creation of a basic herd of working and commercial cattle on state farms.
4. Acquisition of equipment and other working assets by establishments, financed from the state budget, and expenditure on urban beautification.
5. Major repairs.
6. Increase in the standard amount of circulating assets (by sector and type of activity).
7. Increase in state commodity stockpiles.
8. Expenditure on social and cultural measures.*
9. Financing of foreign trade.
10. Defence expenditure.*
11. Expenditure on state administration.*
12. Payments out of profits: a) for the material incentive fund; b) for the production development fund; c) for the social and cultural measures and housing construction fund; d) for other funds and measures.
13. Reserves: a) held by the USSR Council of Ministers; b) held by the Councils of Ministers of the Union republics.
14. Increase in banking sources of credit.
15. Other expenditures.
16. Surplus income (+), financial deficit (—).

* Excluding the capital investments and major repairs.

The volume of profit is calculated in the national income and expenditure balance by sector of the economy in the light of the macro-economic plan. Turnover tax is determined on the basis of projections in the various production plans and the input-output tables allocating key types of output, in accordance with which the tax is set at firmly fixed rates. Social insurance funds are calculated in the balance sheet on the basis of the total wage bill laid down in the macro-economic plan. Foreign trade receipts and expenditures are calculated in keeping with the export-import plan.

Thus, the main sources of finance available to the state are determined in the light of macro-economic planning indicators for the production and sale of output.

Among other sources of finance, note should be taken of depreciation payments and income tax collected from cooperatives and collective farms. Depreciation payments are calculated on the basis of the average annual value of fixed assets (those existing at the start of the planned year plus any new assets commissioned under the investment plan less any assets withdrawn) in accordance with established standards. Income tax is counted separately for consumer cooperatives (35 per cent of profits) and collective farms (0.3 per cent for each per cent of profitability exceeding 15 per cent but not more than 25 per cent of the taxable net income).*

The use of funds is also determined in the light of the corresponding indicators in the macro-economic plan. Expenditure both by the state (from central sources of finance, i.e. the budget) and directly by enterprises (from internal sources) are included in the income-expenditure balance.

Investments are included in the balance to the amount laid down in the macro-economic plan. In accordance with a decision by the Soviet Government, all investments (central and local) are determined in the macro-economic plan beginning from 1971.

Expenditure on major repairs is financed for the whole of the state-owned sector from both depreciation payments and other sources. Grant-aided bodies (schools, hospitals, universities and colleges, etc.) are not charged for depreciation and pay for repairs out of budgetary appropriations.

Since capital investment and expenditure on major repairs are determined for state enterprises and organisations as a whole, expenditures on social and cultural measures (education, health, sport, etc.), and on defence and administration are calculated without these costs.

Expenditure on social and cultural measures is calculated on the basis of the network of schools, higher and specialised

* Collective farms with less than 15 per cent profitability are not liable for tax.

educational establishments, hospitals, health resorts, etc., foreseen in the macro-economic plan and the standard amount of expenditure (per pupil, hospital bed, etc.) in the light of any adjustments made in the general plan for improving the provision of cultural and social amenities for the population.

The national income and expenditure balance (summary financial plan) is not an operational plan and unlike the state budget is not approved by the government. It constitutes an economic estimate which has the aim of balancing national income and expenditure determined on the basis of the macro-economic plan. Disproportions between income and expenditure can be avoided if a financial balance is drawn up in the early stages of compiling a macro-economic plan. Thus, if financial resources laid down in the draft plan for the production and sale of output exceed projected expenditure, then the draft plan can be adjusted to enable additional measures to be taken to improve living standards, increase investment, etc. And conversely, if projected state expenditure cannot be met from income, adjustments must be made to the draft plan with a view to increasing income (the production of goods) or reducing expenditure, i.e. changes are made in the targets for the production and sale of output, the volume of trade, cost reductions, labour productivity increases, and production efficiency.

In this way a financial balance can help to achieve a correct ratio between sources of finance and projected expenditures, and correct, effective proportions for developing the economy laid down in the macro-economic plan.

3. PLANNING PROFIT AND ITS DISTRIBUTION

Profit and profitability are important indicators of production efficiency. Profits are not only the main source of profit and loss funds of enterprises and production associations funds but are also the main source of revenue for the state budget. Profit targets are set in the plan for the various ministries (departments) and Union republics in the field of industry, construction, transport, agriculture (state farms) and certain other sectors.

Profit Planning in Industry

Balance-sheet profits derived from the basic activity of industrial enterprises are approved for the whole of industry in the macro-economic plan. The figure is expressed as an overall indicator, i.e. it is handed down by the appropriate ministries (departments) to enterprises and associations as a basic indicator. The profit figure laid down in the plan is included by the USSR Ministry of Finance in the income-expenditure balances drawn up for ministries and departments which detail the allocation (use) of the various sources of finance. This work is done in the case of republican ministries and departments by the finance ministries of the Union republics.

The planned amount of profit is determined on the basis of projections for indicators related to the production and sale of output, labour productivity, the practical application of science and technology, calculations regarding the use of production assets, and production and selling costs.

The cost per rouble of commodity output broken down by basic technical-economic factors is calculated and the planned level of profitability, the cost price of output, and the profits arising from industrial activity are fixed for each ministry (department) and for each Union republic (in respect of republican industry). In order to arrive at a correct estimate of cost prices and then profits over the planned period, it is essential to make a careful analysis of production costs in the base year and to assess what reserves still exist in the economy for cutting costs. The analysis is made for the same technical and economic factors that underlie the compilation of draft plans.

There follows a schematic calculation of planned profit for a ministry.

	(1,000 roubles)
1. Anticipated stocks of finished goods on 1 January. 1971, in enterprise wholesale prices	140.9
2. Ditto, at prime cost	89.1
3. Carry-over stock appreciation (1—2)	51.8
4. Commodity output in 1971 at wholesale prices	1,904.0

5. Cost of commodity output	1,232.2
6. Carry-over stocks of goods at end of 1971 at enterprise wholesale prices	144.0
7. Ditto, at plant cost	88.2
8. Carry-over stock appreciation (6-7)	55.8
9. Output at enterprise wholesale prices (1+4-6)	1,900.9
10. Cost of output for sale (2+5-7)	1,233.1
11. Profit from sale of output (9-10)	677.8
12. Profit from other sales	1.77
13. Profit (+), loss (-) from non-commercial income and expenditure	0.13
14. Difference between prices used in determining the volume of output for sale and selling prices	0.2
15. Total profits (11+12+13+14)	679.9

Carry-over stocks of finished goods at the beginning of 1971 are determined by calculating the expected fulfilment of the plan regarding the commodity output and costs for 1970. The 1971 planned goal for lowering costs is compared in calculations of planned profits from sales with the expected fulfilment of the plan regarding costs in 1970 (in comparable conditions) amounting to a cut of 3.14 per cent.

Under other sales not included in the volume of output for sale are non-industrial operations and services including those entailed in capital construction; the sale of services provided by transport organisations which operate with an account of their own within industrial enterprises; the sale of goods of procurement organisations included in enterprise accounts; the sale of goods by subsidiary agricultural enterprises; the sale of surplus produce, etc. In cases when the profit from other sales is extremely insignificant, its amount is determined with reference to actual data for previous years.

In a number of other cases the supplier is paid for his goods at prices differing from those adopted in the sales plan. Thus, goods are sometimes sold at retail rather than wholesale prices and at different zonal prices. The difference in selling prices (if the selling zone and the zone in which the supplying enterprise is situated do not coincide, or if goods are sold at retail prices despite the existence of wholesale prices) is shown separately in the profit figures. It

will be positive if output is sold at a higher price than envisaged in the plan and negative if lower.

Profits made from producing goods by utilising by-products and other items of income retained by enterprises (ministries) in full are deducted from the total profits figure. The unretained profits are then distributed as follows. Part of them has to be paid into the budget for the use of fixed production assets and circulating assets and as fixed (rental) payments in accordance with current standard charges, and has to be used to pay bank interest on loans.

Calculations of planned payments into the budget for fixed production and circulating assets are made with reference to the average annual value of fixed production assets planned for the year and to the average annual value of circulating assets (within the standard limits set). No charge is made for: a) fixed production assets paid for out of production development funds for the first two years of the latter's existence; b) for that part of fixed assets paid for out of credit on which the loan is still outstanding; c) for newly commissioned major new shops and production plant during the standard period of attaining full operational capacity; d) for anti-pollution installations and for afforestation schemes counted as fixed production assets.

Enterprises in the extractive industries enjoying particularly favourable natural and transport conditions and enterprises which are far better equipped than others in the same sector and for whose output calculated (individual) prices have not been set, obtain additional (differential) net income. Since this income is not due to their economic efficiency, it has to be paid into the state budget in the form of fixed (rental) payments.

A firm figure per unit of output is laid down for these fixed payments by enterprises in the extractive industries by the USSR Council of Ministers' State Committee on Prices in agreement with the USSR Ministry of Finance and other appropriate ministries. Fixed payments due from enterprises in the processing industries are laid down by the USSR Ministry of Finance, usually as a percentage of sales in wholesale prices.

The profits remaining after these payments have been made are distributed according to established standards for

the setting-up of material incentive funds, for social, cultural and housing construction funds, and for production development funds, as well as for the financing of investment, for increasing circulating assets, for covering losses incurred in the provision of housing and other social amenities, and for other planned needs. Any residual profits are paid into the budget.

The size of incentive funds and the standard deductions to be made into these funds from profits are established for the ministry or government department in the five-year plan depending on the growth of sales (profits) and profitability and on the rates of labour productivity growth. Within these limits ministries (departments) and, in the case of republican industry, Union republics fix the size of these funds for production associations and enterprises. They can also fix standard allocations to these funds from profits made for increasing the sales and the level of profitability and labour productivity in comparison with the previous five-year plan, taking into account different fund-generating factors with due regard for the specific features of their economic performance.

The total amount of economic incentive funds held by ministries (departments) and, as regards republican industry, by Union republics, are fixed in the annual plans in strict compliance with the amounts laid down for them for each year of the five-year plan. The standard amounts to be deducted from profits for payment into the various incentive funds and the size of these funds in the hands of enterprises and organisations are laid down by ministry (department) and by Union republic in such a way that the total amount of money in these funds does not exceed the sum confirmed in the plan (income-expenditure balance) for each ministry and Union republic.

Subject to the size of their approved funds, ministries and Union republics set up reserve funds in accordance with the procedure and on a scale laid down by the Inter-Departmental Commission attached to the USSR State Planning Committee which deals with questions concerning the application of new methods of planning and material incentives motivation and by similar commissions in the Union republics. These funds are used to ensure stability in complying

with standards regarding the increment of similar funds at enterprises and organisations with due regard for the actual conditions of production, for increasing incentive funds at enterprises where the rates of production of new types of output are increasing, etc.

The incentive funds increase if higher rates of their growth are adopted in the annual plan in relation to fund-generating indicators] (growth of sales and profits, rise in the level of profitability and labour productivity) than in the five-year plan and, conversely, they decrease in size if these rates are lower than envisaged in the five-year plan. In this case exponential growth rates are calculated in relation to the base year.

The methodology employed can be illustrated on the hypothetical example of a single ministry.

A standard deduction from profits amounting to 0.620 per cent of the 1970 wage bill which has to be paid into the material incentives fund is fixed for the ministry for each per cent of increase in the growth rate of output compared with the target set in the five-year plan (for the appropriate year); for each per cent (point) of increase in profitability in comparison with the five-year plan target, a deduction equal to 0.663 per cent of the 1970 wage bill is made; and finally for each per cent of increase in productivity, a deduction of 0.3 per cent of the wage bill is made.

The ministry's material incentives fund was fixed for 1973 at 200.8 million roubles. Under the five-year plan the output (profit) growth rate compared with 1970 is fixed at 25 per cent and under the annual plan for 1973—at 30 per cent, i.e. five points higher. Given that the 1970 wage bill amounts to 1,500 million roubles, deductions from profits to be paid into the material incentives fund should be increased by 4.65 million roubles:

$0.620 \cdot 5 = 3.1$ per cent; $1,500 \cdot 3.1 = 4.65$ million roubles.

Under the five-year plan the ministry's total profitability is set to equal 18 per cent, while in the 1973 annual plan the corresponding figure is 20 per cent. The deductions into the material incentives fund should be increased by 1.99 million roubles:

$0.663 \cdot 2.0 = 1.326$; $1,500 \cdot 1.326 = 1.99$ million roubles.

And finally it is intended to raise the five-year plan target for productivity growth by four points (25 per cent instead of 21 per cent). Consequently profit deductions should be increased by 1.8 million roubles:

$$0.3 \cdot 4.0 = 1.2; 1,500 \cdot 1.2 = 1.8 \text{ million roubles.}$$

Given all these conditions, profit deductions should be increased by 8.44 million roubles so that the total amount of these funds will be entered in the ministry's income-expenditure balance for 1973 at 209.24 million roubles. If rates lower than those envisaged in the five-year plan for this year are adopted in the annual plan, then profit deductions should be reduced in accordance with these same ratios.

Stable rates for increasing (decreasing) deductions from profits are fixed for each year of the five-year plan period for USSR ministries and departments by the Inter-Departmental Commission operating at national level and for republican ministries and departments by similar commissions in the Union republics.

The fund set up for social and cultural measures and housing construction is fixed as a percentage of the projected material incentives fund for each year of the five-year period (in comparison with the base year). Thus, it is fixed at 32.3 per cent of the material incentives fund for the Ministry of Electric Power and Electrification, at 50 per cent for the Oil Industry Ministry, at 16.3 per cent for the USSR Coal Industry Ministry, at 29.1 per cent for the Ministry of Machine-Tool and Tool-Making Industry, and at 35.6 per cent for the USSR Light Industry Ministry.

If the plan is not fully implemented in accordance with the fund-generating indicators, then the material incentives funds are reduced in size in accordance with established procedure. In this case the minimum amount of funds is counted, subject to actual profits, as 40 per cent of the planned amount of funds over the period in which the plan was not fulfilled.

The production development fund is made up of part of the depreciation charges earmarked for the complete renewal of fixed assets, deductions from profits, and money from selling off scrap equipment. The standard amount of depreciation charges to be paid into this fund is decided for each

ministry, department and Union republic by agreement with the USSR State Planning Committee and the USSR Ministry of Finance. USSR ministries and departments and the Councils of Ministers of Union republics fix the amount of depreciation charges to be paid into the fund within the standards laid down and decide the differential rates for each group of enterprises having regard for the structure and technical state of their fixed production assets, their renewal dates, etc.

With a view to making better use of the production development fund, production associations and ministries have since 1971 been able to centralise up to 50 per cent of the money paid into it on account of depreciation, with the agreement of the enterprises concerned. This money must be used for a specific purpose in the sector.

As a departure from previous practice, since 1971 standard deductions from profits have been calculated directly as a percentage of balance-sheet profits, or, in the case of enterprises making planned losses, as a percentage of the savings achieved from cutting losses.

Profit Planning in the Construction Industry

Beginning with 1970 subcontracting building and installation organisations have been gradually transferred to a system of planning and evaluating the work of building organisations by the finished objects and initial complexes completed and handed over to clients.

Until recently a profit figure for building organisations has only been put down in the income-expenditure balances drawn up by construction ministries, and there has been no profit indicator for construction in macro-economic plans.

Once the construction industry had gone over to the new system, profit plans drawn up on the basis of planned accumulations fixed in the estimates and of cost reductions were confirmed for the various construction ministries and construction organisations in Union republics. In 1969 new standard estimates and prices were introduced. Planned accumulations were raised in the estimates from 2.5 per cent to 6 per cent of estimated expenditure; this ensures all subdivisions of building organisations to operate profitably.

Subcontractors that have gone over to the new system of planning settle accounts with the customers only for projects or stages of work that have been completed. This links the receipt of profits with the completion of construction work which serves as an inducement to reduce the length of the construction period.

In the same way as in industry, balance-sheet profits, i.e. profits obtained as a result of the operations of all units attached to the building organisations, are shown in the income-expenditure balances (financial plans) and in the financial reports issued by construction ministries and their subcontracting organisations. Since the amount of construction work that is undertaken is determined in the investment plans and frequently does not depend on the subcontractor, neither the increase in the volume of output sold (profit) nor the rise in the level of profitability can be used as fund-generating indicators. In some years subcontractors' profits may rise, in others they may decline. For this reason material incentives funds are formed out of deductions from gross profits as and when customers accept delivery of completed projects or stages of work.

Standard rates of payments from profits into material incentives funds are fixed by Union and Union-republican ministries, by USSR government departments and by republican ministries for a number of years for the various groups of building organisations transferred to the new system.

If the plan for calculated profits is exceeded, then payments into the material incentives fund and the fund for social and cultural measures and housing construction are also increased. Total additional payments on this account are determined in accordance with certain standard rates depending on overfulfilment of the plan.

The production development fund is made up of actual profits in accordance with standard rates set for building organisations transferred to the new system of planning and economic stimulation.

In the income-expenditure balances of building ministries and the financial plans of subcontracting building organisations transferred to the new system of planning, profits are distributed as follows: payments into the budget for

production assets; bank interest charges; and payments into the material incentives fund in accordance with stable standard rates.

The remaining profits are set aside for financing centrally-authorised investments and for repaying loans for them; for financing the increase of circulating assets; training workers; covering losses incurred in the provision of housing and other social amenities; expenditure on the upkeep of cultural and educational establishments, and pioneer camps; on setting up reserve funds in accordance with established procedure within a ministry for providing financial assistance to building organisations, and for other expenditures.

Any residual profits are paid into the budget.

Payment for assets is fixed by Union and Union-republican ministries and republican ministries (in respect of the subcontracting organisations which they sponsor) at rates from 2 to 6 per cent of the value of fixed production assets and rated circulating assets. If construction organisations do not have sufficient profits to set up material incentives funds, they are temporarily exempted from making any payments for their assets.

The profits, payments and budgetary allocations fixed by the construction ministries in the plan are handed down to the building organisations which use them as the basis on which to draw up their income and expenditure balance (financial plan).

Planning Profit in the State Farm Sector

Beginning with 1970, instead of targets for reducing production costs of key types of agricultural produce, a profit figure related to the major farming operation was set in the macro-economic plan for state farms coming under the USSR Agricultural Ministry and those of the Union republics.

In the income-expenditure balances for state farms drawn up by the USSR Ministry of Agriculture (for those farms of all-Union importance) and by the agriculture ministries in the Union republics, the following distribution of profits is laid down:

one per cent payment for assets used for agricultural purposes excluding the value of commercial and working cattle and mature fruit trees;

payments into the material incentives fund—not more than 15 per cent so that payments did not exceed 12 per cent of the annual planned wage bill of all state farm workers;

payments into the fund for social and cultural measures and housing construction—10 per cent;

payments into the insurance fund—20 per cent;

payments into the farm development fund—10 per cent.

Unlike in industry and other sectors of the economy, any residual profits are not taken away in taxes but are set aside for redistribution among other state farms. This happens only once a year at the time when the annual accounts are drawn up.

Planning Profit in Transport Operations

Just as in industry, the sponsoring ministries fix the planned profitability (overall and calculated) of the main operations undertaken by transport enterprises.

Profits are calculated on the basis of the volume of operations, the level of rates of income on current price-lists, and for other operations depending on the current prices for these operations. The cost of transport and expenditure on other operations is deducted from total income. The difference constitutes the profits of transport organisations.

The following distribution of planned profit is laid out in the income-expenditure balances issued by the Ministry of Railways: payments into the budget for fixed production assets; bank interest charges; and for setting up material incentives funds. The remaining profits, as in industry, are directed into financing the increase in circulating assets, and in forming reserve funds in a ministry for giving financial assistance to the railways, etc. The remaining profits have to be paid into the budget.

As regards the merchant marine, profits are earned by cargo, service and auxiliary ships and icebreakers, by foreign ships on charter to Soviet companies, and from loading and

unloading operations and other ancillary work. Shipping profits are defined as the difference between total income and operational expenditures.

Planned calculations of income from carrying cargo and from other traffic operations are undertaken separately for foreign sea-going routes and for long- and short-distance national routes.

Income earned by the merchant marine paid in foreign currency is calculated on the basis of world charter rates and includes additional payments to cover the difference between internal tariffs and world charters. The extra payments are made centrally in Soviet currency.

Planning profits in general-purpose automobile transport displays some special features connected with the nature of the work. In this case profits represent the difference between income from carrying cargo and passengers and expenditure on it including an additional 2 per cent charge on income for road construction.

4. THE USSR STATE BUDGET

The Role of the State Budget

The state budget plays a key role in the system of finance and credit. Under the law regarding the budgetary rights of the USSR and the Union republics, the USSR State Budget constitutes the basic financial plan for the generation and use of state funds. As distinct from other financial plans, it is approved annually by the USSR Supreme Soviet as a law whose implementation is binding for each enterprise and organisation. Over half the national income is concentrated in the state budget for redistribution by the state. Most of the revenue comes from the accumulated funds of socialist enterprises. In 1974 they accounted for 90.9 per cent of total income.

The state budget is closely integrated with all the financial plans of enterprises and organisations, with the plans for credit drawn up by the State Bank and the Construction Bank, with the plans for savings banks, the state social, life and property insurance funds, etc. It is through the

budget that the Soviet state regulates financial plans and checks on their fulfilment. The funds amassed in the budget are used for financing major new construction of enterprises, thus determining the rates and basic proportions in developing the socialist economy, raising living standards and strengthening defence capability. The USSR Budget incorporates the Union budget, the budgets of the Union republics and local budgets.

Funds are allocated from the Union budget to finance measures of country-wide importance, enterprises and economic organisations sponsored at Union level, education and health establishments, the payment of pensions and other measures carried out by Union-sponsored establishments and organisations, and national defence; funds are also appropriated for setting up state stockpiles and monetary reserves; and for maintaining all-Union governmental and administrative bodies. The state budgets of the Union republics incorporate republican and local budgets. They are used to finance measures for building up the economy undertaken by the governments of the Union republics and local authorities. Local budgets incorporate the budgets of local Soviets from the smallest village to the major administrative areas as well as the budgets of autonomous republics. They have the job of financing local economic development, the provision of services for the general public and other measures.

Each budget has its own sources of income. The following receipts are included in the Union budget: a) turnover tax collected from enterprises and organisations excluding that part paid into the state budgets of Union republics; b) payments out of the profits of Union-sponsored enterprises and economic organisations (payments for production assets, fixed (rental) payments and any residual profits); c) personal income tax excluding that part paid into the state budgets of Union republics; and d) customs and other receipts as legislated by the Union government.

The following receipts are paid into the state budgets of the Union republics: a) payments out of the profits of enterprises and organisations sponsored by the republic's Council of Ministers and by the local Soviets; b) forestry income; c) income tax collected from cooperatives and collective

farms; d) the agricultural tax; e) payments out of personal income tax; f) duties, local taxes and other receipts as provided for under Soviet legislation.

Every year when it approves the USSR state budget, the USSR Supreme Soviet lays down what kind of income should be paid into the budgets of the Union republics and allocates them additional funds out of all-Union income. Certain Union republics may have additional funds paid into their budgets out of the Union budget.

The distribution of income between republican budgets and budgets of local Soviets is established under legislation of the Union republics.

Budgetary Income and Expenditure

As already noted, the accumulated funds of socialist enterprises and economic organisations constitute the main source of state budgetary income. They take two forms—turnover tax and payments out of profits. Total turnover tax is determined on the basis of production plans and input-output tables showing the distribution of the main types of output on which this tax is imposed. Payments out of profits form an important and ever-increasing proportion of budgetary income. In 1974 they accounted for 32 per cent of all such income.

The social insurance budget whose funds are managed by the trade unions forms part of the state budget. In the Soviet Union every single worker is insured out of state funds. Each state enterprise and establishment contributes funds to the social insurance budget according to rates (expressed as a percentage of the total wage bill) laid down by the government. In 1974 they amounted to about 10.6 billion roubles. The insurance funds are used by the trade unions to pay out benefits in the case of temporary disability, maternity and convalescence benefits and pensions for working pensioners.

Foreign trade receipts (customs revenue) are an important source of funds for the state budget. Export receipts and income derived from the economic operations of foreign trade associations are another source. These receipts are

all calculated with reference to the export-import plan which is in turn determined in the light of the state plan for economic development.

Receipts from cooperatives and collective farms are also counted as income in the state budget and in the national income-expenditure balance. Funds collected from the population (taxes and fees) represent only a small part of the budget (about 8.5 per cent in 1974).

State budgetary expenditure can be divided into four groups: for economic development, social and cultural measures, defence, and state administration. Expenditure on developing the economy is the basic item in the budget which is proof of its enormous role in undertaking socialist extended reproduction.

In recent years considerable changes have taken place in the financing of capital investment, since there has been a substantial increase in internal enterprise funds and in bank credit for this purpose. In 1974 state investment (both central and local) amounted to 87,400 million roubles. Over 33,000 million roubles was financed from the state budget. The rest was done from internal funds and bank credit. Thus, grant financing of capital construction is being replaced by financing from internal funds and long-term credit. This heightens the responsibility of ministries and Union republics for making more economic use of resources.

Substantial changes have also been made in the financing of circulating assets. Any shortfalls at enterprise level are now replenished either from internal funds or by means of two-year loans granted by the State Bank rather than as previously from budgetary funds.

A characteristic feature of the budget in a socialist economy is the high level of expenditure on satisfying social needs. State expenditure on social and cultural measures is determined with reference to the macro-economic plan which provides for the development of a network of health, education, and cultural establishments, etc. In 1972, 36 per cent of total budgetary expenditure was allocated for these purposes.

5. CREDIT PLANNING

The Role of Credit

In contrast to the budget which disburses grant finance, credit offers enterprises loan funds which must be repaid to the bank within a certain period of time. These funds can only be used for the purposes for which they were received. Thus, conditions regarding use and time limit are attached to credit. Credit plays an important part in the development of the economy and is an important instrument used by the state for exercising monetary control over production and the sale or distribution of output.

State and cooperative enterprises and organisations are obliged to keep all their liquid assets in a current account at the State Bank, or in the case of building organisations at the Construction Bank. In this way assets that are temporarily not being used in the production process can be used as a source of short-term credit for economic organisations and building projects. The State Bank can also draw on personal savings deposited in savings banks under its control for this purpose. Additionally it can use any surpluses from the Union budget and any liquid assets from republican and local budgets deposited with it.

The State Bank's Credit Plans

Planned economic development requires that credit be planned too. Credit plans are drawn up by the State Bank in conjunction with the USSR ministries and government departments and those of the Union republics. They are compiled for each quarter on the basis of the macro-economic plan, the state budget and the plan for the supply of materials and technical equipment to the economy and approved by the government.

Credit plans are drawn up in the light of progress being made in executing the macro-economic plan and the budget. Credit is granted or refused depending on whether planning targets have been fulfilled. If, for example, no allowance

has been made in the credit plan to grant credit for above rated stocks of material values, enterprises must either use them up in production or dispose of them in order not to experience any financial difficulties. Credit plans take the form of a balance sheet, showing resources at the beginning and end of the quarter by source and end-use. The main types of credit—planned loans and loans for the temporary replenishment of working capital—are planned by the USSR ministries and departments and by Union republics, while other types of credit are planned integrally for the whole economy.

Once the government has approved the credit plan, the State Bank in accordance with instructions issued by the ministries and departments informs its branches in the republics and major local administrative areas of the credit ceilings for each enterprise at the end of the quarter, and the branches then hand this information down to their local offices.

Collective farms receive the funds they need directly from the State Bank in the form of a bank credit. They are granted loans to pay for material inputs and wages until such time as they obtain funds from selling their output. The amount of credit required is determined on the basis of their production and financial plans. The provision of short-term credit to state farms by the State Bank is increasing in importance. It is granted for the financing of seasonal work (seasonal costs for crop farming), costs incurred throughout the year in raising young cattle, and for other needs. Besides this, in the course of the year the State Bank gives loans for investment for production purposes until such time as profits which form the planned source of investment finance are made.

On the basis of the macro-economic plan and the state budget and in conjunction with the ministries and councils of ministers of Union republics concerned, the State Bank works out and presents to the government for its approval annual plans for the provision of long-term credit. Such credits are granted to collective farms, state enterprises, consumer cooperatives and the population (for housing construction and domestic needs). Long-term credits given to state farms operating on an economic accounting basis,

for the construction of production projects and for the acquisition of necessary equipment, are granted for the same periods and on the same conditions as those laid down for collective farms.

The Construction Bank's Credit Plans

The Bank for Construction undertakes the financing and the provision of credit for construction in industry and transport, in urban areas and for public works. Up until 1965 construction was mainly financed from the State Budget. Funds were paid out without any time limit on their use or any form for repayment and thus failed to stimulate a reduction in the length of construction or the period before which investments made a return. At the present time expenditure on the construction of new enterprises which can be recovered within five years is financed from internal funds or from credit granted by the Construction Bank. The modernisation and expansion of existing enterprises are also financed from internal funds or credit, regardless of the length of time before costs are recovered.

Starting in 1971, the total volume of investment—both central and local—is fixed for ministries and Union republics in the macro-economic plans. Construction financed from development funds and funds for social and cultural measures and housing construction as well as bank credits for productive, cultural and social and housing construction, occupy an important place in total volume of local-financed investments.

The Construction Bank grants long-term credit for organising and expanding the production of consumer goods and building materials, for the construction and expansion of enterprises providing services to the general public and of automobile transport facilities. Long-term loans are also provided under the plan for the construction of houses by house-building cooperatives and for individual house-building in towns and industrial housing estates.

Enterprises obtain long-term credit from the Construction Bank for the construction of houses and buildings used for social and cultural purposes when sufficient money is

not available from the fund for social and cultural measures and housing construction.

The Bank obtains its funds for long-term credit from repaid loans and from the Union budget.

Now that building organisations have been switched to drawing up accounts for a completely finished project or its operational stage, the Construction Bank provides credit for work-in-progress.

CHAPTER IX

PLANNING FOREIGN ECONOMIC RELATIONS

1. THE BASIC TASKS OF LONG-RANGE AND ANNUAL PLANS FOR THE DEVELOPMENT OF FOREIGN ECONOMIC RELATIONS

Foreign trade is an important source for economising in the use of social labour on a macro-economic scale. By taking advantage of the international division of labour and foreign trade, the Soviet Union is able to obtain essential goods that are comparatively expensive to produce or are not produced at all in the domestic economy. Macro-economic demand for different types of goods, therefore, is met by importing them at less cost than if producing them domestically.

Thus, one of the tasks involved in preparing plans for foreign trade is to determine the best ratio between the volume of domestic production and imports of particular types of goods so as to keep to a minimum the total macro-economic expenditure necessary to satisfy social demand.

One of the central tasks in planning the Soviet Union's economic relations is to coordinate its economic development plans with the plans of the socialist member-states of the Council for Mutual Economic Assistance (CMEA). As a result of coordinating these plans, commitments relating to the development of production and the mutual exchange of various goods, recommendations and agreements on specialisation and cooperation in the field of production, and agreements on technological cooperation and lines of credit are directly reflected in plans regarding the Soviet Union's economic relations with the respective socialist countries. In the light of these commitments, long-term trade agreements and annual protocols on the exchange of goods are, for the coun-

tries concluding the agreements, a sort of common foreign trade development plans.

The Ninth Five-Year Plan period (1971-1975) has gone down in the history of Soviet foreign trade as a period of exceptionally intensive and rapid development, the result of steady growth of the country's economic, scientific and technical potential. The Soviet Union's trade and economic relations are carried out on the principles of equality and mutual benefit. The transition to new, complex forms of cooperation has great significance, including the conclusion, as a rule, of ten-year governmental agreements on economic, industrial, scientific, and technical cooperation, the undertaking of large-scale projects on a compensation basis, and cooperation in the sphere of foreign exchange and credit relations. In 1976-1980 external trade turnover will grow by 30 to 35 per cent, which will be higher than the growth rates for national income. Around 85 per cent of exports will be the products of heavy industry. Imports of mass consumer goods and raw materials for their production will be increased, in particular those kinds whose domestic production is either impossible or inefficient. This will create the material conditions for raising the share of the consumption fund in the national income and for a growth in the volume of turnover of various goods.

Long-range plans for a period of five years or longer determine the rate of growth of foreign trade, fundamental changes in the commodity structure of imports and exports, the product range and volume of imports and exports, the main geographical direction of foreign trade and anticipated changes in it, as well as the volume of credit and the basic areas of technological cooperation between the Soviet Union and various groups of countries. When long-range plans are being prepared, the future production of goods for export is coordinated with existing capacities and projected capital investment, and with resources of manpower, and raw and other industrial materials on the basis of aggregate indicators.

Current (annual) plans for the development of foreign trade are designed to give concrete expression to long-term plans and to incorporate any necessary adjustments arising from changes in the situation on foreign markets, and in keeping with the requirements and capabilities of the nation-

al economy. Annual plans are compiled on the basis of long-term planning goals, taking into account the actual figures of plan fulfilment for the year preceding the planned year. In the event of any partial imbalances or planning setbacks occurring in the economy, the possibility of overcoming these by means of foreign trade is examined.

2. THE CONTENT AND INDICATORS OF PLANS FOR THE DEVELOPMENT OF FOREIGN ECONOMIC RELATIONS

The planning of foreign trade and other forms of foreign economic relations takes place along two main lines: firstly, according to the nature of the foreign or associated domestic economic operations and, secondly, according to the organisations carrying out certain functions in foreign trade or in another sphere of foreign economic relations.

The basic foreign trade operations include the export and import of goods, international freight transport, insurance, foreign exchange transactions, credit transactions in foreign exchange (in the case of the purchase or sale of goods on credit), and financial credit and payment transactions in Soviet roubles.

Foreign trade operations that are identical in character may be carried out by different organisations, which is also reflected in the planning of foreign trade. Thus, for example, in the Soviet Union, exporting can be carried out by the following bodies.

1) the all-Union associations and foreign trade offices* within the Ministry of Foreign Trade;

2) the all-Union associations within the USSR Council of Ministers' State Committee for Foreign Economic Relations, which is responsible for the supply of machinery and materials for equipping projects being built abroad with Soviet technical assistance;

* For example, Timber Exports (Eksportles), All-Union Oil Exports (Soyuznefteksport), Engineering Exports (Mashinoeksport), Shipping Imports (Sudoimport) and others.

3) the Central Engineering Directorate under the above committee, which deals with the supply abroad of military and other special equipment;

4) the Central Union of consumer cooperatives, which is empowered to carry on trading operations with cooperative organisations in other countries.

5) organisations of the Ministry for the Merchant Marine, which sell bunker fuel, ship's provisions, etc., to foreign ships in Soviet ports.

The above-mentioned foreign trade operations are not the only economic relationships that the Soviet Union has with other countries. The Soviet Union provides technical assistance to many socialist and developing countries in the building of different industrial enterprises and other projects for production or non-production purposes and, like most other countries, exports and imports different kinds of services (sea, rail and air transport, communications, tourism, etc.). Under economic aid programmes, the Soviet Union offers long-term credit to many developing countries and at the same time makes use of fairly large banking and commercial credits in a number of Western countries. The credit relationships of the USSR with the socialist countries are widely developed.

All these many kinds of economic relationships are directly or indirectly reflected in the plans for foreign economic relations.

In the Soviet Union at the present time the following plans for the development of foreign economic relations are being prepared and approved by the government as independent plans:

1. The export-import plan (foreign trade plan)—annual and long-term.

2. The plan for the supply of machinery and materials for projects being built abroad with Soviet technical assistance—annual and long-term.

3. The summary foreign exchange plan (balance of payments) of the Soviet Union—annual.

Apart from this, those sections of the macro-economic plan that define the activities of the Ministry for the Merchant Marine, civil aviation and the transport and telecommunications network, contain certain indicators relat-

ing to the volume of foreign trade traffic, as well as the import and export of services. All foreign exchange transactions associated with these operations are reflected in the foreign exchange plan. The USSR State Budget determines for the planned year the amount of customs revenue and other budgetary income and expenditure associated with foreign trade operations.

Foreign Trade Plans

The annual (current) import-export plan consists of the following four sections.

Sections I and II. Exports and imports by country, showing for each country or group of countries the goods to be exported to, or imported from, a given country, as well as the total volume in value terms of the exports and imports (at foreign trade prices) broken down by form of transaction: payment in currency or through a clearing system, on state credit, commercial credit (i.e., by instalments) and transactions in the local currency of the countries with which the Soviet Union is trading.

The sections of the plan with the indicators for exports and imports by country, showing particular goods, i.e., in a "country-commodity" breakdown, contain figures for the total volume (in value terms) of Soviet exports and imports for the planned year, and are compiled with breakdowns for the following groups of countries:

1. the socialist countries:

- a) countries that are members of CMEA;
- b) countries that are not members of CMEA;

2. the capitalist countries:

- a) countries with transactions in freely convertible currency;
- b) countries with transactions through a clearing system with free conversion;
- c) countries with transactions through a closed clearing system (without free conversion) and into a non-convertible currency.

The group of countries, for which separate plans are prepared, is not strictly laid down, but usually includes all the socialist countries, as well as other countries with which

the Soviet Union has long-term payment and trade agreements or with which annual trade protocols are concluded.

In the "country-commodity" section of the plan, the range of export and import goods and the degree of detail, are not laid down either, and are determined in the first instance on the basis of the actual existing or projected commodity structure of trade with a given country; in the case of countries with which there are trade agreements and lists of goods available for exchange, the product range in the plan is close to the range on these lists.

The total volume of exports and imports by country includes the supply of machinery and materials for entire enterprises and other projects being built abroad with Soviet technical assistance, as well as the supply of military and other special equipment.

Thus, the first two sections of the plan determine all the basic indicators for the development of foreign trade for the planned year, i.e.:

the total volume of exports and imports, which determines the rate of growth of foreign trade;

the volume of exports and imports by country and groups of countries, which determines the geographical direction in the development of foreign trade;

the exports and imports of different types of goods for each country, which reflect the commodity structure of foreign trade;

the amount of foreign exchange receipts from exports and payments for imports, as well as the volume of credit operations, i.e., the initial information determining the state of the balance of payments by country and type of currency.

Section III. The plan for the supply of goods for export by the USSR ministries and government departments and the Union republics. It usually consists of two subsections:

1) plant and machinery;

2) raw and industrial materials, and consumer goods. The supply of goods by type is planned in the context of the ministries, departments and Union republics, responsible for the respective enterprises manufacturing and delivering output for export.

The quantity of output (goods) to be supplied for export is shown in the units of measurement used in the allocation

tables and plans. In many cases, in order to provide greater detail about the tasks relating to the supply of goods for export, as well as the name of the commodity, a short qualitative description, or its grade, type, brand, model, etc., is given.

The plan for the supply of goods for export is the basis for the All-Union associations of the Ministry of Foreign Trade or other foreign trade organisations to issue orders for the production and supply of export goods.

Section IV. The plan for the supply of goods to the macro-economy by means of imports. It contains the tasks given to the foreign trade organisations relating to the purchase abroad and the supply to the country's economic organisations of certain types of output. This section also usually consists of two subsections.

- 1) plant and machinery (separately for socialist and capitalist countries);

- 2) raw and industrial materials, and consumer goods.

The quantity of imports is shown in physical units or according to value (in foreign exchange roubles). The actual recipients of the imported goods are not usually specified but are determined at a later date by the USSR State Planning Committee or the State Committee for Material and Technical Supply of the USSR Council of Ministers, which are responsible for allocating them. On the basis of this section of the plan, the recipients of imported goods make out their orders to the All-Union associations of the Ministry of Foreign Trade for their purchase and import.

Long-range plans for the development of foreign trade contain a considerably narrower range of indicators than the annual plans. These usually make provision for the total volume and rate of growth of foreign trade, as well as the volume of exports and imports of goods that are most important to the national economy.

The Supplies Plan

At the same time as export and import plans, plans are prepared for the supply of machinery and materials for projects being built abroad with Soviet technical assistance-

The annual plan consists of the following basic sections and indicators.

1. The value at export prices of supplies of machinery and materials for entire projects (the value of these supplies is included in the total volume of exports established by the export and import plans for the respective year) and the value of Soviet technical assistance to other countries in building projects (design and development, help in construction, installation of machinery, commissioning, etc.). These value indicators are broken down by country and form of transaction, as in the export-import plan.

2. Assignments relating to export supplies of machinery and materials for projects being built abroad with Soviet technical assistance, broken down by USSR ministry and department and Union republic.

3. A list of machinery to be purchased abroad for subsequent delivery for projects being built in other countries with Soviet technical assistance (a list of machinery for re-export). This section of the plan serves as the basis for the purchase abroad of certain types of machinery which, for one reason or another, cannot be produced in the Soviet Union but which must be supplied under the heading of other machinery necessary for the construction of projects abroad that are being set up with Soviet technical assistance.

Besides these planned indicators, project-by-project lists of plant and machinery, to be supplied in the planned period in compliance with commitments and schedules for the construction of these projects, are compiled during the preparation of the draft plan for use as a basis for calculation.

The Balance of Payments

The Soviet Union's summary foreign exchange plan (balance of payments), which is compiled for each planned year, contains the following basic sections and indicators:

1) trading operations (exports and imports and associated expenditures);

2) services (the export and import of transport, communications and technical services, tourism, etc.);

3) non-trading operations (assessment payments to international organisations, etc.);

4) credit and property (the movement of money capital and property);

5) grants.

For each section summary data, relating to payments and receipts, are compiled in foreign exchange roubles: for all countries; for the socialist countries as a whole, including CMEA members, with whom transactions are made in transferable roubles through the International Bank of Economic Cooperation, and for each of the socialist countries; for all the countries with whom transactions are carried on in freely convertible currency; for all the capitalist countries as a whole and for each of the countries with whom transactions are made through a clearing system. For each of these countries and groups of countries a payments balance is drawn up, showing their net transactions with the Soviet Union (groups of countries by currency and method of payment) for the planned year.

As the payments balance shows only those transactions that give rise to associated foreign exchange payments and receipts, a supporting table shows the volume of exports of goods and services from the Soviet Union financed by state credits and in the form of grants (as a total and broken down by country) projected for the planned year.

Reference tables appended to the balance of payments contain figures relating to the Soviet Union's credit operations projected for the planned year and the credit position of the Soviet Union vis-à-vis other countries at the beginning and the end of the planned year. These make it possible to coordinate current balance-of-payments transactions with trends in credit and the actual credit position.

The appendix to the Soviet Union's summary foreign exchange plan (balance of payments) contains the foreign exchange plans of USSR ministries and departments, whose economic activity is associated with foreign exchange income and expenditure, the Ministry of Foreign Trade, the State Committee for Foreign Economic Relations of the USSR Council of Ministers, the Central Union of Consumer Societies of the USSR, the ministries of the merchant marine, civil aviation, the transport and communications network, the USSR Ministry of Fisheries, the Department of Foreign Tourism of the USSR Council of Ministers, the USSR

State Bank, as well as the USSR Ministry of Finance, whose foreign exchange plan (for non-trading operations) includes estimates of the foreign exchange revenue and expenditure of all the other ministries and departments which do not have their own plans.

All the above foreign exchange plans are compiled on the same lines as the USSR summary foreign exchange plan (balance of payments.)

3. THE PROCEDURE AND METHODOLOGY ADOPTED IN PREPARING DRAFT PLANS FOR THE DEVELOPMENT OF FOREIGN ECONOMIC RELATIONS

The draft plans for the development of foreign economic relations (as also those for the development of the economy as a whole) are prepared on the basis of a government decree regarding the procedure and completion dates to be adopted in compiling the macro-economic plan. This decree regulates the functions of all the ministries and departments participating in the preparation of the draft plans, and the stages and completion dates for carrying out the various operations.

Work on the plans for the development of foreign economic relations is done in the following basic stages:

I. For long-range plans—the elaboration and confirmation of the basic lines determining the main tasks and indicators in the development of foreign trade, the Soviet Union's technological and economic cooperation with other countries, and foreign exchange transactions. For annual plans—the preparation by the USSR State Planning Committee of control figures for the planned year, which are then handed down to the appropriate ministries and departments.

II. The preparation of draft plans for exports and imports and the supply of machinery and materials for projects being built abroad with Soviet technical assistance, and draft foreign exchange plans of the Ministry of Foreign Trade, the USSR Council of Ministers' State Committee for Foreign Economic Relations, the Central Union of Consum-

er Societies of the USSR, the Ministry of the Merchant Marine and other ministries and departments having their own foreign exchange plans.

III. Work in the USSR State Planning Committee on the drafts for the above plans, with the participation of the interested ministries and departments, their coordination with plans for the production and allocation of associated industrial and agricultural output, and with capital investment and finance plans. The compilation of the draft USSR summary foreign exchange plan (balance of payments) by the USSR State Planning Committee, in conjunction with the Ministry of Finance, on the basis of the ministry and department draft foreign exchange plans.

IV. The elaboration of measures designed to ensure the fulfilment of the draft plan and the associated draft decrees of the USSR Council of Ministers regarding the export-import plan, the plan for the supply of machinery and materials for the equipment of projects being built abroad with Soviet technical assistance, and the USSR summary foreign exchange plan (balance of payments).

V. The examination by the government of the draft plans for the development of foreign trade and of the draft foreign exchange plans.

The Planning and Economic Department is responsible for organising the work of compiling the draft export-import plan within the Ministry of Foreign Trade, and the Foreign Exchange Department for that of the draft foreign exchange plan. A similar procedure is adopted in the USSR Council of Ministers' State Committee for Foreign Economic Relations.

Submissions regarding the draft plan are prepared for particular ranges of export and import goods by the All-Union associations directly involved in foreign trade operations.

[The associations' draft plans for the supply of goods for export and the supply of imported goods to the national economy are examined and revised by the appropriate export and import departments of the Ministry of Foreign Trade, as well as by the departments dealing with questions of developing trade with particular groups of countries.

The Planning and Economic Department, with the participation of the Foreign Exchange Department, which deals with questions of prices and balancing payments with particular countries, finalises the draft export-import plan.

Within the USSR State Planning Committee the work of compiling the draft export-import plan, the draft plan for the supply of machinery and materials for projects being built abroad with Soviet technical assistance, and the draft foreign exchange plans, is carried out by the Department for Foreign Trade. However, all the main departments of this committee take part in the work, as well as the appropriate ministries and departments, with whom the Department for Foreign Trade maintains constant contact in the course of compiling the drafts.

The methodological principles of preparing these draft plans arise out of the functions performed by foreign trade and other economic relations with foreign countries. The basic methodological principles can be formulated as follows:

1. The analysis of the input-output linkages between foreign trade and other sectors of the economy: calculation of the material, financial and foreign-exchange resources involved in the sphere of foreign economic relations.

2. The determination of the economic benefits obtained by the economy as a result of the country's participation in the international division of labour.

3. Consideration of the external political effects of the development of foreign trade and economic and technological cooperation with other countries.

Let us examine in general outline the main input-output linkages utilised in the preparation of plans for the development of foreign economic relations.

In the first, preliminary, stage these linkages are taken into consideration when the projected volume of exports and imports of particular goods is determined for a particular planned period. The general outline of work is as follows:

1. The preliminary determination of the volume of exports of particular goods, as a total and by country (commod-

ity lists in a "commodity-country" breakdown) on the basis of:

the level of exports reached in the preceding years;

the commitments arising as a consequence of the cooperation of the economic development plans of the Soviet Union and other socialist countries and long-term trade agreements concluded with the socialist countries;

the commitments arising from long-term trade agreements concluded with other countries;

the analysis of market conditions and the demand for Soviet export goods in foreign markets, and the approximate assessment of possibilities for increasing exports in order to secure foreign exchange earnings;

the assessment of the economic effectiveness of expanding the export of particular goods.

2. Re-examination of the possibilities of achieving the projected volumes of exports of particular goods on the basis of the anticipated volume of production of these goods and the demand from other macro-economic sectors (examination of the physical input-output tables), as well as the assessment of the technological and organisational possibilities of manufacturing and exporting output in response to overseas demand.

3. The preliminary determination of the volume of particular imports on the basis of macro-economic demand, taking into consideration decisions already taken by the government in relation to the import of particular goods, plant and machinery.

4. The allocation of the projected volume of imports by country (commodity lists in a "commodity-country" breakdown) and their re-examination on the basis of:

the commitments arising as a result of the coordination of the macro-economic plans of the Soviet Union and the CMEA member-states as well as the long-term trade agreements with these countries;

the volume of particular imports reached in preceding years, the assessment of foreign market conditions, and the possibilities of purchasing goods within the necessary time-limits.

Thus, in the course of the preliminary determination of the volume of imports and exports in a "commodity-country"

breakdown, the draft import-export plans are coordinated with plans for the production and allocation of these types of output, with the help of physical input-output tables.

The second stage in the work on the draft plan for the development of foreign trade then begins, the aim of which is to prepare the plans for the development of trade with particular countries and groups of countries.

On the basis of the projected volume of imports and exports in particular goods and the preliminary determination of imports and exports by country, the draft plan is formulated for the development of trade with particular countries or groups of countries (in a "country-commodity" breakdown for imports and exports). While this is being done, another examination is made: to what extent the projected volume of imports and exports will help to fulfil the commitments undertaken by the Soviet Union as regards the development of trade with, and technical and economic assistance to, each of the countries. If necessary, the draft plan is amended accordingly.

At this stage of preparing the plans, one of the most important tasks is to balance the foreign exchange transactions by country and currency group, i.e., to coordinate the import-export plan and the Soviet balance of payments.

The size of export earnings and import payments depends not only on the range and quantity of goods exported or imported but also on the price of these goods. In the initial period of work on the plan, therefore, the plan prices for key import and export goods are determined on the basis of previous figures and an assessment of possible market fluctuations; a calculation can then be made of the total volume of imports and exports in value terms, as well as of the amount of anticipated payments for imports and receipts from exports. The magnitude of these sums is determined in each case by taking into account the projected credit relations and methods of payment.

This gives the real balance of trade with particular countries or particular groups of currency (transactions in transferable roubles with CMEA member-states, clearing transactions and transactions in hard currency). Taking into account all other payments and receipts in connection with

trade and other commercial operations (earnings and payments made in connection with international freight hauls, and the export and import of transport services play the most important part), as well as various types of payments and receipts of a non-commercial nature (the cost of diplomatic representation abroad, for example), makes it possible to determine the anticipated balance for the planned year, broken down according to country and currency group.

The position of the balance of payments, i.e. the relationship between anticipated payments and receipts for particular countries or currency groups, exerts a very considerable influence on the content of the import-export plan. If the balance of payments is in deficit, it is usually necessary either to seek out additional supplies of goods to increase exports to that country to the extent necessary to cover the deficit, or to reduce imports, which obviously has an effect on the total supply of imports to the economy.

Thus there is a close association between the balance of payments position and the physical input-output tables for different types of output, particularly if exports form a large proportion of domestic output or, conversely, if imports comprise a large proportion of the country's total supplies of a commodity, and the foreign exchange cost is significant. If additional productive capacities are necessary to increase exports, then capital construction is also linked with the balance of payments position. There is a similar interdependence between the balance of payments and wholesale stocks of goods for eventual sale, inasmuch as a certain portion of consumer goods are supplied to the retail market from imports.

All these linkages mean that several revisions must be made in the import-export plan and in the balance of payments, as well as in many other sections of draft macro-economic plans.

The economic efficiency of foreign trade, as also the efficiency of socialist production as a whole, is determined by comparing the result obtained by society in the form of goods (products of labour) with social expenditure on producing them. Efficiency can be determined only by taking into ac-

count all the linkages in the economy that arise because part of the social product is drawn into the sphere of international exchange.

The economic efficiency of foreign trade is calculated according to the following formula:

$$\Delta y_f = x + E_m - Z$$

where Δy_f —the change in national income as a result of foreign trade;

$x + E_m$ —the value of the total social product available to society as a result of production and imports;

Z —the costs of producing the social product, including that which is exported.

The coefficient for the efficiency of foreign trade is correspondingly expressed as

$$E_f = \frac{x + E_m}{Z}$$

This method of determining the economic efficiency of foreign trade can only be used if there are sufficiently reliable value indicators to enable an estimate to be made of the social product available to society (or, to be more precise, that which will be available, as we are speaking rather of planning calculations and the costs to society of producing the social product). For this, domestic prices must reflect social costs (the total macro-economic expenditure) of producing goods in the Soviet Union, and account must be taken of the technological and economic substitutability of all goods (products of labour) as use values (or, in other words, their degree of scarcity).

At the present time, the efficiency of foreign trade is determined in planning calculations by a simplified method, by comparing the costs of producing export goods with the costs that the country would have to bear had the imported goods, bought with foreign exchange earnings from exports, been produced domestically.

Such an approach to determining the economic efficiency of foreign trade in making long-term calculations does not in theory conflict with the method set forth above, and is a variant of the solution to the same problem of minimising costs for a given outcome.

If the total costs incurred in the domestic production of imported goods (or the total production costs from which the economy is freed by meeting part of the demand for goods through imports) amount to ΣZ_m and the total expenditure on the production and transport to the border of the goods that must be exported to pay for the imports is ΣZ_E , then the economic efficiency of foreign trade is

$$\Delta y_f = \Sigma Z_m - \Sigma Z_E \quad (\text{roubles})$$

and the coefficient for the economic efficiency of foreign trade is

$$E_f = \frac{\Sigma Z_m}{\Sigma Z_E}.$$

If $E_f > 1$, the country will obtain an additional benefit as a result of foreign trade, i.e., the results obtained by society in the form of imported goods will be greater than the costs of producing export goods equivalent in foreign exchange value.

If $E_f < 1$, foreign trade is economically inefficient and results not in a rise in the country's national revenue but in a fall.

If $E_f = 1$, foreign trade does not affect total production costs but simply solves the input-output problems involved in the exchange of certain goods for others.

At the present time, when determining the economic efficiency of foreign trade, the rated indicator of calculated costs is used, as in the formula

$$Z = M + EK,$$

where E equals 0.15.

If the foreign exchange necessary to pay for imports may be obtained by different export variants, the most economical one should be selected. To this end, indicators of the relative efficiency of exports in particular goods are used:

$$\bar{E}_e = \frac{B_E}{Z_E} \quad (\text{foreign exchange roubles/roubles})$$

where B_E — net foreign exchange earnings, obtained from the sale of goods;

Z_E —macro-economic expenditure on the production and transport of these goods.

The converse indicator, expressing the relative efficiency of imports,

$$\bar{E}_m = \frac{Z_m}{B_m} \quad (\text{roubles/foreign exchange roubles})$$

where Z_m —costs of the domestic production of the same goods or import substitutes;

B_m —total foreign exchange costs of imported goods.

When comparing export variants of one and the same or different goods but to different countries and currency zones, the export efficiency is determined by taking into account the purchasing power of the currency obtained from the exports. For this, the coefficient of the relative efficiency of exports is multiplied by the average coefficient of the efficiency of imports from the given country or group of countries:

$$E_E = \frac{B_E}{Z_E} \cdot \frac{\sum Z_m}{\sum B_m}.$$

Thus, allowance is made for the fact that the foreign exchange obtained by exporting to different countries is used to pay for imports with varying degree of efficiency depending on the commodity structure of the imports, the level of import prices and the transport costs of delivering the goods to the borders of the Soviet Union.

If exports and imports are paid for on credit, the above indicators of the economic efficiency of foreign trade are adjusted using the formula for compound interest, taking into account the length of time between the date of delivery and date of settlement, resulting from the offered terms of credit and the instalment arrangements.

The analysis of the efficiency of exporting and importing particular goods does not yet make it possible to discover the optimal variant of the import-export plan that would ensure that the best possible use is made of the advantages of the international division of labour.

In accordance with the tasks of improving planning and increasing the efficiency of socialist production, USSR State Planning Committee is preparing an automated system for the optimal planning of foreign trade.

The preparation and introduction of this system will do much to improve the economic validity of plans for foreign trade and economic cooperation and to increase the economic efficiency of social production.

In the first stage of the work, automated calculations made of the planning and economic indicators of Soviet foreign economic relations should be ensured. In the second stage, a system of models for the optimisation of plans for foreign trade plans and the technical design for the system are worked out.

The economic benefit derived by the economy as a result of foreign trade is taken as the optimisation criterion. This benefit, as demonstrated above, is determined by the difference between the result of foreign trade, expressed in terms of the estimated value of the bulk of imports (or the rate of costs that would be incurred if these goods were produced at home), and the costs to the economy of supplying exports.

The most general form of optimisation of the plan for foreign trade is obtained by solving the following problem:

$$\sum_{i=1}^e \cdot \sum_{r=1}^s Z_{ir}^m \cdot Q_{ir}^m - \sum_{j=1}^n \sum_{r=1}^s Z_{jr}^E \cdot Q_{jr}^E \rightarrow \max.,$$

where Z_{ir}^m — the costs of production or cost estimate of a unit of the i th product imported from the r th country;

Q_{ir}^m — the quantity of the i th product purchased in the r th country ($i = 1, 2, 3, \dots, e$; $r = 1, 2, 3, \dots, s$);

Z_{jr}^E — the costs of producing the j th product exported to the r th country;

Q_{jr}^E — the quantity of the j th product exported to the r th country ($j = 1, 2, 3, \dots, n$; $r = 1, 2, 3, \dots, s$);

There are, in fact, a number of conditions and constraints which make the problem of optimising the plan for foreign trade considerably more complex.

Firstly, the objective function is correct only in the case of foreign trade which is in balance as regards the total foreign exchange earnings from exports and the foreign exchange cost of imports. Such a balance must be maintained, not only for foreign trade as a whole, but also for trade in individual types of currency, clearing transactions, etc. Fulfilling this requirement imposes additional constraints on the whole automated system for the optimal planning of foreign trade, in the first instance, knowledge of the foreign trade prices of export and import goods as regards each country or type of currency, the necessity of forecasting these prices in the planned period, etc.

Secondly, considerable constraints are imposed by export possibilities. Thus, the supply of exports in certain products and the possibilities of sale on a given export market may be severely limited, i.e., in the above objective function the quantities Q_{jr}^E take on limiting values. Apart from this, the costs of producing export goods for each of them can likewise change under the influence of various factors, including the quantity of exported goods

$$Z_j^E = f(Q_j).$$

On the other hand, the volume of exports of the product Q_{jr}^E can also affect the export price and thus result in a change in the proportions of commodity exchange on foreign markets.

Similar conditions and constraints operate in respect of imported goods.

The problem of optimising foreign trade is considerably complicated when a proportion of exports and imports are traded on a credit basis. In such cases account must be taken of the factor relating to the different timing of costs and benefits arising from the actual or anticipated efficiency of capital investment in the planned period and the actual credit terms.

If the problem of optimising the plan for foreign trade is solved, better proportions will be achieved between the volume of total production and the volume of production for export, and between total consumption and that proportion of it that is met by importing those amounts which provide minimum total macro-economic expenditures necessary to meet social demand.

CHAPTER X

THE MACRO-ECONOMIC INPUT-OUTPUT TABLE

1. THE ROLE PLAYED BY THE MACRO-ECONOMIC INPUT-OUTPUT TABLE IN PLANNING

The establishing of scientifically substantiated proportions in the development of the socialist economy as a whole, by industries and economic regions, calls for ever stricter balancing of plans. This must be ensured, as the decisions of the 25th CPSU Congress stressed, on the basis of improving the system of physical and value input-output tables, and the input-output tables of industrial capacity and fixed assets and manpower. These problems are tackled on a country-wide scale by using the macro-economic input-output table, which reflects the main results, proportions and factors in the sphere of socialist reproduction. The input-output table represents the culminating point in the macro-economic plan as the plan for extended reproduction, expressing the unity of economic linkages that is essential for a balanced development of the economy.

The macro-economic input-output planning table is used to coordinate the main objectives and indicators of economic development. This involves not just keeping the plan in balance but maintaining optimal proportions and ratios to ensure growth in the efficiency of social production, a high rate of economic development as a whole, and a constant rise in the living standards of the people.

The input-output planning table occupies a special position in the compilation of both annual and long-range macro-economic plans: it is not only the summary section of the macro-economic plan, an expression of its unity, internal consistency and economic validity, but also an effective

means and method used in the preparation of the plan. Even at the preliminary stages of preparing the plan, the calculations for the table help to determine the rates and proportions of development of the socialist economy in the planned period.

At this stage, the following summary indicators are calculated: the volume and trend of the social product, of national income and of capital investments, the level and trend of labour productivity, the volume and growth rates of output in key sectors, the level of real personal income, and the volume of trade.

In current planning practice three methods are used in the preliminary preparation of the macro-economic indicators. One of them is based on a determination of the growth potential in manpower resources and labour productivity. Proceeding from an analysis of demographic data on the structure of the population and manpower resources, as well as other data, the possible number of man-hours in the sphere of material production is calculated. Productivity growth trends are then studied, and calculations made of potential growth in productivity depending on the following major factors: the amount of power and the amount of assets per worker and structural shifts in production which effect the level of productivity. This makes it possible to arrive at a determination of trends in the social product and national income—the main overall indicators of macro-economic growth. Thus, growth in national income can be represented as the product of the indices showing the growth in the number of workers and in labour productivity.

Another method is based on an analysis of trends in fixed production assets and the increase in their output, as the index of national income equals the product of the indices of the physical volume of the fixed assets and the returns-on-assets ratio.

Finally, macro-economic input-output calculations at the preliminary stage of preparing the long-range plan can be based on given volumes of personal consumption, allowing for a rise in standard consumption, on draft schemes for the development of the non-productive sphere, housing construction, etc. Projections, which are determined by the volume and trends in people's personal needs, are based on standard

consumer budgets and estimates of population growth. This method is obviously closely linked with the first two: the results obtained must be coordinated with production conditions and the possibilities of the planned period.

The total aggregated drafts for the macro-economic input-output table serve as the point of departure for preparing more detailed draft plans relating to the different economic sectors and the non-productive sphere. These more detailed calculations enable the economy's needs to be matched with sources in the best way.

At this stage of preparing the plan, the main indicators and proportions of macro-economic development are determined. These include: the allocation of manpower resources and the number of man-hours available to the different sectors; the possible growth in labour productivity; the volume of fixed assets and capital investment; their utilisation; the volumes and rates of growth of the social product and national income, consumption and accumulation; the physical-output structure of consumption and accumulation; industrial and agricultural output and the relation between the two; the correlation between Departments I and II of social production, etc.

The detailed calculation of the above indicators may necessitate changes being made in the preliminary figures in the macro-economic input-output table. As a result of calculating a series of variants for the input-output table, the definitive variant is determined, which forms a section of the draft summary economic development plan. At this final stage the input-output table expresses the unity of the sections and indicators of the plan and their inter-coordination. The overall indicators are now, in their turn, determined on the basis of concrete calculations in all sectors of the economy.

The macro-economic input-output planning table is compiled in the form of separate input-output tables, the main ones of which are: a) the physical reproduction table; b) the national income table—the financial table of reproduction; c) the summary table of manpower resources.

Analytical Indicators and Calculations

The basic analytical indicators of economic development are calculated on the basis of the tables in the macro-economic input-output table.

The social product. The index of growth in the gross social product. The physical-output and sectoral structure of the social product (the production of producer goods, including machinery, etc., and consumer goods broken down by the main types of output within these subsections, the gross output of industry, agriculture, construction, transport, trade, and other sectors). The share of social sectors in the total social product. The capital intensity of the gross product (by fixed and circulating assets); the materials intensity of the annual product, as well as the metal, power and fuel intensity.

The sectors of material production. The indices of growth in the gross product; the physical-output structure of the gross sectoral output; indicators relating to the utilisation of material and manpower resources; labour intensity, materials intensity, etc.; indicators of transport operations.

The national income. Indicators of the growth and structure by economic sector and social sphere, the national income produced and utilised. Calculations of the factors relating to the growth of national income: an increase in the size of the labour force, growth in output per worker, savings in material inputs.

The indicators of accumulation. The indices of growth in accumulation; its physical-output and economic structure (accumulation in the form of fixed production assets, fixed non-production assets, stocks of goods and products held for production and consumption purposes, etc.).

Capital investment and fixed assets. The indices of growth; indicators of technological structure—reproductive, physical-output, sectoral and social. Capital investment for productive and non-productive purposes. Indicators of the efficiency of capital investment (both absolute and relative).

Indicators of consumption and living standards. Indices of growth; indicators of structure—physical-output and social (by use). Analysis of these indicators is based on figures

relating to the growth in consumption of material goods and services, as well as the increase in basic non-production assets as a whole and per capita. This section also includes indicators of the trends in the real incomes of factory and office workers and peasants.

The main proportions in the plan include the relations between current personal money incomes and the supply of goods and services. The analytical tables, therefore, include a table of figures relating to the trend in the purchasing power of industrial and office workers and peasants. The figures for trade—its growth and structure—are directly linked with the indicators of real incomes and living standards.

The indicators of foreign economic relations and foreign trade. The volume, trend and structure of exports and imports, the efficiency of foreign trade, etc.

The indicators of increased efficiency in social production. The analysis of the input-output table and the plan is concluded by calculating indicators of the efficiency of production. The following can be used as general indicators of the efficiency of production: growth in the generation of national income as a whole, per worker and per capita, and growth in real incomes as a whole and per capita.

These are supplemented by the system of indicators, which express individual elements or factors in the general efficiency of production. They include: utilisation of fixed and circulating assets; profitability of the economy as a whole and of the sectors; savings in material and labour inputs as a whole, and including those associated with shifts in the structure of production.

Depending upon the tasks of the macro-economic plan, these analytical indicators, as also the tables in the macro-economic input-output table itself, are modified, supplemented or worked out in greater detail with a view to the wider coverage and deeper analysis of the processes of extended socialist reproduction and a fuller assessment of its results and factors.

2. THE PHYSICAL INPUT-OUTPUT TABLE OF REPRODUCTION

This section of the macro-economic input-output table illustrates the turnover of material goods in the economy—their production, consumption and accumulation. The physical input-output table of reproduction includes:

- 1) the input-output table of production, consumption and accumulation of the annual social product;
- 2) the input-output table of fixed assets;
- 3) the physical input-output tables of the most important types of output (both producer and consumer goods).

The input-output table of production, consumption and accumulation of the annual social product is one of the key tables in the macro-economic input-output table. This table coordinates the annual volume of production of material goods and their utilisation. It shows, separately for producer and consumer goods, the scale of annual production of output, its consumption in production, in the personal sector, and, finally, accumulation, i.e., the volume of material goods that are used to expand production and increase the volume of personal consumption. The table also determines the size of the national income and the share of consumption and accumulation in it.

The social product is examined from the point of view of its physical-output structure (Departments I and II, and the sectors and subsectors of material production) and value (both transferred and newly created in the given year; this last represents national income, the source of non-productive consumption and accumulation).

The structure of the gross social product that has been utilised consists of the replacement of material inputs; personal and non-productive consumption; and accumulation. These last two items are components of national income. The final utilisation of national income takes place as a result of the processes of redistribution and the creation of various funds for social expenditure. Thus, wages and the surplus product are originally created in production. The surplus product is used to create funds for social consumption (the maintenance of the non-productive sphere, social security), and accumulation (including reserves).

The social product is the sum total of the material goods created by labour in the sphere of material production. In some instances, for example in the sectors involved in the transport of goods, inputs of labour are not expressed in physical use values. However, these inputs of labour do form part of the value of the physical goods that are transported.

The output produced by each individual enterprise passes on to other enterprises for further processing or batching, or as fixed production assets, or enters into the sphere of personal and non-productive consumption.

The indicator that best lends itself to planning macro-economic linkages is the *gross social product* which embraces the total turnover of material goods, including the flow of what are known as intermediate goods. The use of this indicator ensures the necessary consistency between the different parts and objectives of the plan (the coordination of production and consumption, production and capital investment, production and transport, etc.). The social product is determined by sector of material production. In 1974, the structure of the gross social product was illustrated by the following figures:

in 1,000 million roubles	
Gross social product	846.4
Including:	
industry	525.6
agriculture	121.7
transport and communications	34.1
construction	86.4
trade, procurement, material and technical supply, etc. . .	48.6

The Input-Output Table of Gross National Product

The main purpose of compiling this particular table is to determine the necessary links between the economic sectors and the end uses of gross national product.

In abridged form, the table contains the following indicators (in value terms).

A Schematic Composition of Gross Social Product

I. The structure of the production of material goods (the "subject" table).

The social product.

Including:

producer goods (by type according to classification);
consumer goods (by type according to classification).

Of the total social product:

industrial products (by sector of industry);
agricultural products (by sector of agriculture);
construction products (by type and purpose).

II. Production and use of material goods (the "predicate" table).

Circulating assets at the beginning of the year.

Volume of output (by economic sector and sector of production).

Trade and transport mark-up.

Imports.

Consumption in production (by economic and production sector and separately for Departments I and II).

Non-productive consumption.

Including:

personal consumption;
consumption in non-productive establishments.

Exports.

Accumulation.

Circulating assets and stocks at the end of the year.

The Union republic social product input-output table calculations also include the item "Exchange of goods with other republics".

The most important relationship in the table is the identity between the volume of production for the year and the sum of productive consumption, non-productive consumption and accumulation.

The volumes of production, production consumption and accumulation are shown separately for state and for cooperative and collective farm enterprises.

The above schematic outline includes all the main principles of such a table. In practice, the tables that are used in the input-output table of national product contain indi-

cators of varying degrees of accuracy depending on practical necessities and the quality of available past statistics and planning data.

The indicators of the reproduction of the social product express the various forms of its economic use: the replacement of used-up producer goods, non-productive consumption (personal consumption and material inputs in the non-productive sphere) and, finally, accumulation.

In addition, the items "Annual turnover of output" include imports (on the income side of the table) and exports (on the expenditure side). These items must be included in the table because the export-import balance has an effect on the actual accumulation of material goods. Net imports increase physical accumulation, while net exports decrease it.

Finally, in order to coordinate annual production with the available circulating assets, changes in stocks are reflected in the table. To this end, circulating assets and stocks are shown as at the end and the beginning of the year. Reproduction of the basic means of production is examined in a separate table, since the social product table reflects only annual production, physical depreciation over the given year and accumulation in the form of the basic means of production.

The sphere of material production includes: a) extractive and processing industries, b) agriculture, c) construction, d) freight transport and communications serving production, e) trade (wholesale and retail), procurement, public catering, material and technical supply, and f) other sectors of material production.

The volume of the social product produced in any year is determined in money terms as the total gross output of the above sectors of material production.

Productive consumption includes consumption of raw and other industrial materials, fuel, and electricity, according to the classifications in the "subject" table, as well as the depreciation of fixed production assets, and is determined by sector of material production.

Non-productive consumption includes personal consumption and physical inputs in the non-productive sphere. Most of the latter can be regarded as an addition to indirect personal consumption. It includes consumption of material

goods in the provision of cultural and social services (education, health, passenger transport, etc.). The item "Personal consumption" has separate entries for consumption by industrial workers, office workers and peasants.

Consumption is divided into separate groups of consumer goods—foodstuffs, beverages, clothing and footwear, household articles, etc.

The grand total in the table "Accumulation" is determined for production as a whole and for all the different types of output as the surplus of annual production over consumption (productive and personal), taking the balance of exports and imports into account. In real terms, accumulation is expressed in increased amounts of producer and consumer goods. Accumulation of material goods in a given year, therefore, is inseparable from the assets and stocks with which they are linked. From this it also follows that total accumulation and its product composition can be established by comparing the size of the fixed assets and stocks at the beginning and end of the year (taking into account the balance of exports and imports and material losses due to natural disasters).

According to product composition and purpose, accumulation in the economy consists of the following elements:

- growth in the fixed assets of all sectors of material production;

- growth in the fixed non-production assets (housing, and buildings used for cultural and social purposes, etc.);

- growth in the circulating assets of production in industry, agriculture and construction;

- growth in stocks of consumer goods in the trading network and the personal sector;

- growth in stockpiles and contingency stocks.

The social product input-output table, compiled along the lines indicated above, makes it possible to establish a series of general indicators of reproduction and interrelationships between the parts of the social product.

The physical conditions for simple and extended reproduction are determined in the national product input-output table. The coordination of the items in the table makes it possible to determine the physical-output structure of production necessary for the used-up goods to be replaced and the ratios to be increased in accordance with the

need to expand production and raise personal consumption.

For the purpose of establishing more precise production interrelationships between and within the economic sectors, an inter-sectoral input-output table of the production and allocation of output is prepared (see Chapter V of Volume I). By using this table, flows of material goods linking producers with consumers can be traced and quantified. They are reflected in the social product table in the form of ties between aggregate economic sectors. Whereas the physical input-output tables in many cases solve the problem of analysing the interrelationships in production, the inter-sectoral input-output table gives a more detailed account of all the production links. By using computers, a series of variants of the table can be calculated with a view to selecting the optimal variant.

The social product input-output table is compiled in the actual prices current at each year, i.e., the prices at which the goods are exchanged and at which costs, profits and personal incomes, etc., are generated. In long-range plans, the individual indicators in the table are in addition calculated in comparable (constant) prices of a particular year, usually the base year of the long-range plan. Such indicators include: the gross social product as a whole and by individual sector, national income, consumption and accumulation, fixed assets, etc.

Table 21

Structure of the Social Product in 1959-1973

(in percentages, in comparable 1972 prices)

	1959	1966	1972	1973
Total aggregate social product	100	100	100	100
Including:				
Department I (means of production)	60.3	63.2	63.4	63.6
Department II (consumer goods)	39.7	36.8	36.6	36.4

Table 21 shows the ratio between Departments I and II in the aggregate social product of all branches of material production, calculated from the data of the accounting inter-sectoral input-output tables for 1959, 1966, and 1972 and preliminary estimates of inter-sectoral linkages for 1973.

From the figures in Table 21 it is clear that the proportion of means of production in the aggregate social product rose markedly in the first seven years (from 60.3 per cent in 1959 to 63.2 per cent in 1966) and has not changed essentially since. Stabilisation was brought about by convergence of the production growth rates for products of both Departments I and II, mainly in the leading sector of the economy—industry.

From the indices of the input-output table of the social product, in which the distribution and actual utilisation of products is shown, it can be determined what part of the means of production goes to the production of means of production and what part to consumer goods. In 1972, 64.6 per cent of the total output of Department I was used to produce means of production and 35.4 per cent, to produce consumer goods. In addition to an analysis of the physical-material composition of the social product, the figures of the social product table make it possible to determine its value structure, to analyse costs of production and profitability for the economy as a whole, and so to clarify how the process of reproduction of the social product is proceeding by physical-material composition (means of production and consumer goods) and by value (in current prices).

The value structure of the aggregate social product for the economy as a whole and for the main economic departments is shown by the data in Table 22.

Analysis of the value structure of the aggregate social product shows that the proportion of productive physical inputs rose considerably in current prices in the years 1959-72, due mainly to the raising of wholesale prices for means of production and of procurement prices for farm produce. The primary distribution of the national income was also altered. In spite of a significant rise in wages in all sectors of material production, their weight in the aggregate social product was rather lower in 1972 than in 1959. The fall took

Table 22

Value Structure of the-Aggregate Social Product
(as percentages of the total, in prices of the respective years)

Total aggregate social product	Total product	Productive physical inputs	Wages and other earnings	Surplus product
1959	100	50.8	26.1	23.1
1966	100	54.4	23.9	21.7
1972	100	56.3	22.0	21.7
Including:				
means of production				
1959	100	52.1	29.5	18.4
1966	100	57.7	24.7	17.6
1972	100	59.5	22.2	18.3
consumer goods				
1959	100	49.0	21.3	29.7
1966	100	49.2	22.6	28.2
1972	100	50.8	21.7	27.5

place mainly in Department I; and the weight of wages in the total volume of production in Department II was rather higher than in 1959, though lower than in 1966.

The Input-Output Table of Fixed Assets

The input-output table of fixed assets is an integral part of the physical input-output table of reproduction: it shows the reproduction of fixed assets (separately for production and non-production assets). An abridged outline of this table is given below.

The table is compiled in two variants: according to value before providing for physical depreciation, and according to full (original or replacement) value.

In the first case, physical depreciation of fixed assets is expressed in the sum charged for depreciation over the year, while the change in the volume of fixed assets is determined

Table 23

Economic sectors	Fixed assets at beginning of year	Newly-commissioned fixed assets	Physical depreciation and assets withdrawn from use	Fixed assets at end of year	Growth in fixed assets over year
Industry					
Agriculture					
Etc.					

as the change in their value (taking into account the scrap value of the fixed assets withdrawn from use in the given year as a result of physical or technological obsolescence).

The table of fixed assets according to their full (original or replacement) value expresses the change in their volume or quantity. In this case, the item "Assets withdrawn from use" shows their physical withdrawal as a result of physical or technological obsolescence or for other reasons.

The input-output table of capital expenditure is closely linked with the fixed assets table. The capital expenditure table, for the whole economy and for individual sectors, is compiled along the following lines: a) construction in hand

Table 24

The Input-Output Table for Fixed Assets for 1973

(according to value before providing for physical depreciation, in 1,000 million roubles)

	All fixed assets	Production fixed assets	Non-production fixed assets
Existing at beginning of year . . .	1,002	626	376
Commissioned during year	105	75	30
Withdrawn from use because of dilapidation or physical depreciation	24	19	5
Existing at end of year	1,083	682	401
Growth in fixed assets during year	81	56	25

at the beginning of the year; b) capital investment during the year; c) newly commissioned fixed assets; d) construction in hand at the end of the year.

The table is used in planning capital investment and current amount of work-in-progress in construction that ensures the commissioning of fixed assets beyond the planned period.

As compared to capital investments, the input-output table of fixed assets shows both the reproduction of the assets themselves and the sources for replacing or expanding them.

The comparison of the growth in fixed assets with the increase in gross and net output plays a significant part in determining the level of efficiency of capital investment.

The figures in Table 24 illustrate the reproduction of fixed assets according to physical volume.

The figures in the input-output table of fixed assets according to physical volume make it possible to determine the level of utilisation of fixed assets, the returns-on-assets ratio or its reciprocal, the level of capital-intensity.

Physical Input-Output Tables

Physical input-output tables of particular types of industrial and agricultural output (raw and other industrial materials, fuel, machinery, and consumer goods) are used for comparing sources with uses. The preparation of these tables necessitates using progressive standard rates of consumption of raw and other materials, and fuel in production and construction. The tables form the basis of allocation plans and plans for the supply of the most important types of raw and other materials, fuel and machinery to the different sectors of production and construction, as well as of plans for supplying the retail market with goods.

In planning practice, different types of physical input-output tables are used according to the economic purpose of the planned output, the length of the planned period for which the tables are prepared, and the scale of operations. Depending on the economic purpose of the output, they are divided into tables of objects of labour (raw and other industrial materials, fuel and electricity); tables of instruments of labour (plant and machinery, cables and instruments);

and tables of consumer goods (foodstuffs, clothing, goods for cultural and social purposes and domestic use).

Long-range and current physical input-output tables can be distinguished according to the length of the planned period. The long-range tables are, in their turn, divided into tables covering an extended period (15 years), and tables covering each five-year plan. They are compiled in the form of estimated tables for a narrow range of the most important types of output in the economy. Thus, when the Five-Year Economic Development Plan for the years 1971-1975 was being prepared, the USSR State Planning Committee compiled such tables for approximately 300 items of the most important types of output. Current tables for a wider range of industrial and agricultural output are usually prepared for a year and, when necessary, in six-monthly or quarterly breakdowns within the planned year.

All-Union, republican, sectoral and regional input-output tables differ according to their scale of activity. The composition of the indicators and the methodology used in preparing them for each type of table have their own particular features according to their end-use: capital construction, special expenditures, exports, wholesale and retail stocks, replenishment of state stockpiles, operating (undistributed) reserves, the creation of stocks of goods at the end of the year according to who holds them, consumers, or suppliers at their warehouses.

The volume of industrial output on the "sources" side of the tables is determined from calculations assuming the fullest use of existing productive capacities, as well as the commissioning and bringing on stream of new capacities by means of modernisation and new construction. The volume of imports is determined according to projections for the foreign trade plan. Provision is made for supplies of goods from imports by taking into account the specialisations of individual sectors of production in countries of the socialist community, as well as goods obtained through trade with capitalist countries.

It is most important when preparing the physical input-output tables that macro-economic demand for the respective types of output is carefully and accurately determined. Demand for material resources for production and operational

needs are usually calculated by the direct calculation method on the basis of fixed standard rates of consumption of materials and the planned volume of output in the production of which they will be consumed. In the physical input-output tables, demand for production and operational needs, and construction, are broken down according to their principal areas of consumption. Thus, the table for ferrous metals rolled products shows the way they are allocated for the needs of engineering and metal-working with separate divisions for the basic, most metal-intensive sectors (heavy engineering, and the automotive, tractor, electrotechnical industries, etc.), consumer goods production and capital construction.

Provision is made for the volume of wholesale and retail stocks in accordance with the projected rise in standards of living on the basis of projections of the trade plan, as well as the ratio between money income and expenditure of the population. Material resources directed via central supply agencies for construction in other countries are singled out in the volume of exports. Stocks of goods remaining at the end of the year in the hands of consumers and suppliers and at supply-trade warehouses are calculated according to standard rates on the basis of the need to maintain an uninterrupted supply of materials and technical equipment to production and construction, and to minimise total stocks and accelerate their rate of turnover. The physical input-output tables are usually compiled in physical terms. For certain types of output, the tables are prepared in value units of measurement. Physical and value tables of plant and machinery are prepared to coordinate planned volume with capital investment.

The preparation of physical input-output tables for individual types of output has its own particular features. The fuel table, for example, is compiled as an estimated summary table of all types of fuel expressed in terms of coal equivalent, taking into account the calorific value of the individual types of fuel. On the basis of this, tables and plans are compiled for the allocation of specific types of natural fuel, including by coalfield. The tables for engineering output distinguish certain important areas of use: the outfitting of engineering output; agriculture, including land reclama-

tion and water supply; and measures for the mechanisation and automation of production processes and the introduction of new technology.

In the first stage of preparing the physical input-output tables, total macro-economic demand for the respective output is determined and, by comparing this with resources, a deficit or surplus is revealed. The USSR State Planning Committee, in conjunction with the planning commissions in the Union republics and USSR ministries and departments, then carries out the complex operation of matching resources of the respective types of output with consumption. This is done by partially re-allocating capital investment among sectors and branches of production, revising projected commissioning dates of productive capacities, and the volume of production and consumption, and by changing other elements in the table. As a result, in the last stage, input-output tables of the most important types of output are compiled, which are inter-coordinated and in which possible resources are brought into line with macro-economic demand.

3. THE INPUT-OUTPUT TABLE OF NATIONAL INCOME

The input-output table of national income, or the summary financial input-output table of reproduction, is the section of the macro-economic input-output table which reflects movement of incomes—the generation of incomes as a result of the sale of output, and their primary distribution in the sectors of material production, the redistribution of incomes by the socialist state, and the emergence, on this basis, of derived incomes in the non-productive sphere, and the utilisation of incomes for consumption and accumulation.

National income is created in the sectors of material production and differs from the social product by the amount of producer goods expended (including the depreciation of fixed production assets).

The volume of national income at the various stages of reproduction is defined in different ways: at the stage of

production, as the total net output of sectors of material production (*generated* national income); at the stages of distribution and redistribution, as the total primary incomes of workers in the sphere of material production and of socialist enterprises or as the sum total of the final incomes of the population and establishments (*distributed* national income); and at the stage of utilisation, as the value of consumption and accumulation (*utilisable* national income).

In 1974, net output in the sectors and national income were illustrated by the following figures:

(in actual current prices; in 1,000 million roubles)

Industry	186.3
Agriculture	65.2
Transport and communications	21.5
Construction	39.0
Trade, procurement, material and technical supply, etc.	41.7
Macro-economic total	353.7

From the data on the value structure of the national income produced, the ratio of surplus profit to wages can be determined, or the rate of surplus product ($m:v$). Calculation of this index is very important for analysing the primary distribution of the national income both for the economy as a whole and for its separate sectors.

Figures showing how the ratio of surplus product (m) to wages (v) has changed are given in Table 25.

Table 25

Primary Distribution of the National Income
(relation of surplus product to wages, in %)

	1959	1966	1972
All sectors of material production	88	90	98
of which sectors producing:			
means of production	62	71	82
consumer goods	139	125	127

The rate of surplus product rose in 1972 compared with 1959 by 10 points; 8 points of the rise occurred in the period 1966-1972. The reduction in the gap between the rate of surplus product in Departments I and II should be noted; it is the consequence of improving the operative system of prices.

On the scale of the macro-economy, utilised national income differs from created income by the sum of the loss and gain in foreign trade. In 1974 the national income employed in the economy was 348,200 million roubles. Of this total, 250,000 million roubles were used for consumption (71.8 per cent) and 98,200 million roubles for accumulation and other expenditure (28.2 per cent).

National income, estimated for any one period in comparable prices, is the basis for calculating the index of the physical volume of material goods, which make up the physical content of social income, consumption and accumulation. Growth in the physical volume of national income per person employed in the sphere of material production shows the growth in the productivity of social labour, which is the chief criterion of the increased efficiency of social production.

In 1971-1975 the national income used for consumption and accumulation increased by 28 per cent, with an absolute increment of 76,000 million roubles. Around four-fifths of the increment came from higher productivity of social labour.

The summary financial input-output table summarises the tables of income and expenditure of productive socialist enterprises (state, and cooperative and collective farm), establishments and organisations in the non-productive sphere, and the population.

Whereas the input-output tables of reproduction show the production and utilisation of material goods, the financial input-output tables reflect the phase of exchange and distribution.

The following is a schematic outline of the input-output table of national income (in abridged form):

I. Economic sectors and branches (the "subject" table).
Macro-economic total.

Including:

state productive enterprises (by sector);
 cooperative and collective farm enterprises (by sector);
 establishments in the non-productive spheres;
 population (by social group).

II. Generation and movement of incomes (the "predicate" table).

Volume of output.

Sale of output.

Material inputs in production.

National income (net output).

Primary incomes of workers in the productive sphere, including bonuses and other incentive payments.

Profit made by productive enterprises (surplus product).

Payment(—) into the financial credit system or receipts(+).

Incomes paid (—), received (+) at establishments in the non-productive sphere.

Payment (—), receipts (+) of pensions, grants, benefits.

Payment for services: receipts (+), expenditure (—).

Purchase of goods.

Non-productive consumption.

Accumulation.

The national income is distributed according to the economic laws of socialism. The state directs the necessary resources into capital investment and the expansion of production, the sources being the surplus product of enterprises. The socialist state also requires resources for various social and cultural needs, administration and the strengthening of national defence.

The major part of national income is redistributed by means of the state budget, which is by way of being an estimate. an input-output table of state revenue and expenditure. Besides the budget, incomes are redistributed by other establishments in the Soviet financial and credit system—state insurance and social insurance institutions, banks and savings banks.

Redistribution also generates derived incomes, i.e. the incomes of people employed in the non-productive sphere (in educational establishments, the health service, etc.), and incomes from some form of social security.

The final incomes of enterprises, establishments and the population, available for consumption and accumulation, are generated as a result of all these processes.

For the purpose of compiling specific plans for the distribution and redistribution of incomes, a detailed table is prepared showing the transactions of enterprises, establishments and the population with the financial and credit system.

The figures given below show the utilisation of the national income in 1961-1974 (in 1,000 million roubles averaged for the years, in comparable 1965 prices).

Table 26

	1961-65	1966-70	1971-74
Utilised national income	168.0	233.2	305.0
Including:			
consumption by the working people and their families out of the earnings of workers and employees in the productive sphere and the incomes of collective farmers . . .	77.8	103.6	129.75
expenditure on education, the health service, meeting the cultural and other needs of the public, and social consumption	25.2	39.8	57.75
maintenance of the non-abled population (old age pensioners and disabled workers, war invalids, people temporarily incapacitated, etc.)	10.6	16.0	22.75
expenditure on science	4.4	8.2	13.25
productive accumulation and increase of stockpiles	27.2	37.2	46.25
non-productive accumulation . .	10.0	12.4	17.25
defence expenditure	12.8	16.0	18.0

The input-output table of personal income and expenditure is an integral part of the national income table, and is compiled both for the country as a whole and for the Union republics and administrative regions of the Soviet Union.

The Soviet Union has a great deal of experience in preparing the macro-economic input-output table. Taking advantage of this experience, other socialist countries have for a number of years also been compiling statistical input-output planning tables that take account of their national specifics.

Techniques for preparing the macro-economic input-output table are constantly being improved for the purpose of ensuring a high growth rate of production, creating an efficient production structure, increasing the nation's welfare and achieving an optimal combination of consumption and accumulation. It is particularly important that the macro-economic input-output tables are not only compiled for the country as a whole but also for each Union republic.

Recommended Literature

1. K. Marx, F. Engels, *The Poverty of Philosophy*, Moscow, 1969.
2. Karl Marx and Frederick Engels, "Critique of the Gotha Programme", *Selected Works* in three volumes, Vol. 3, Moscow, 1973.
3. K. Marx, F. Engels, *Anti-Dühring*, Moscow, 1975.
4. Karl Marx, *Capital*, Vol. 1, Moscow, 1975.
5. Karl Marx, *Grundrisse der Kritik der politischen Ökonomie*, Moscow, 1939.
6. V. I. Lenin, "On the So-Called Market Question", *Collected Works*, Vol. 1.
7. V. I. Lenin, "The Development of Capitalism in Russia", *Collected Works*, Vol. 3.
8. V. I. Lenin, "The Agrarian Question and the 'Critics of Marx'", *Collected Works*, Vol. 5.
9. V. I. Lenin, "Draft Programme of the Russian Social-Democratic Labour Party", *Collected Works*, Vol. 6.
10. V. I. Lenin, "The State and Revolution", *Collected Works*, Vol. 25.
11. V. I. Lenin, "The Immediate Tasks of the Soviet Government", *Collected Works*, Vol. 27.
12. V. I. Lenin, "Draft Plan of Scientific and Technical Work", *Collected Works*, Vol. 27.
13. V. I. Lenin, "A Great Beginning", *Collected Works*, Vol. 29.
14. V. I. Lenin, "Notes on Electrification", *Collected Works*, Vol. 42.
15. V. I. Lenin, "The Eighth All-Russia Congress of Soviets", *Collected Works*, Vol. 31.
16. V. I. Lenin, "Integrated Economic Plan", *Collected Works*, Vol. 32.
17. V. I. Lenin, "Instructions of the Council of Labour and Defence to Local Soviet Bodies", *Collected Works*, Vol. 32.
18. V. I. Lenin, "Granting Legislative Functions to the State Planning Commission", *Collected Works*, Vol. 36.
19. V. I. Lenin, "How We Should Reorganise the Workers' and Peasants' Inspection", *Collected Works*, Vol. 33.
20. V. I. Lenin, "Better Fewer, but Better", *Collected Works*, Vol. 33.
21. *24th Congress of the CPSU*, Moscow, 1971.

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